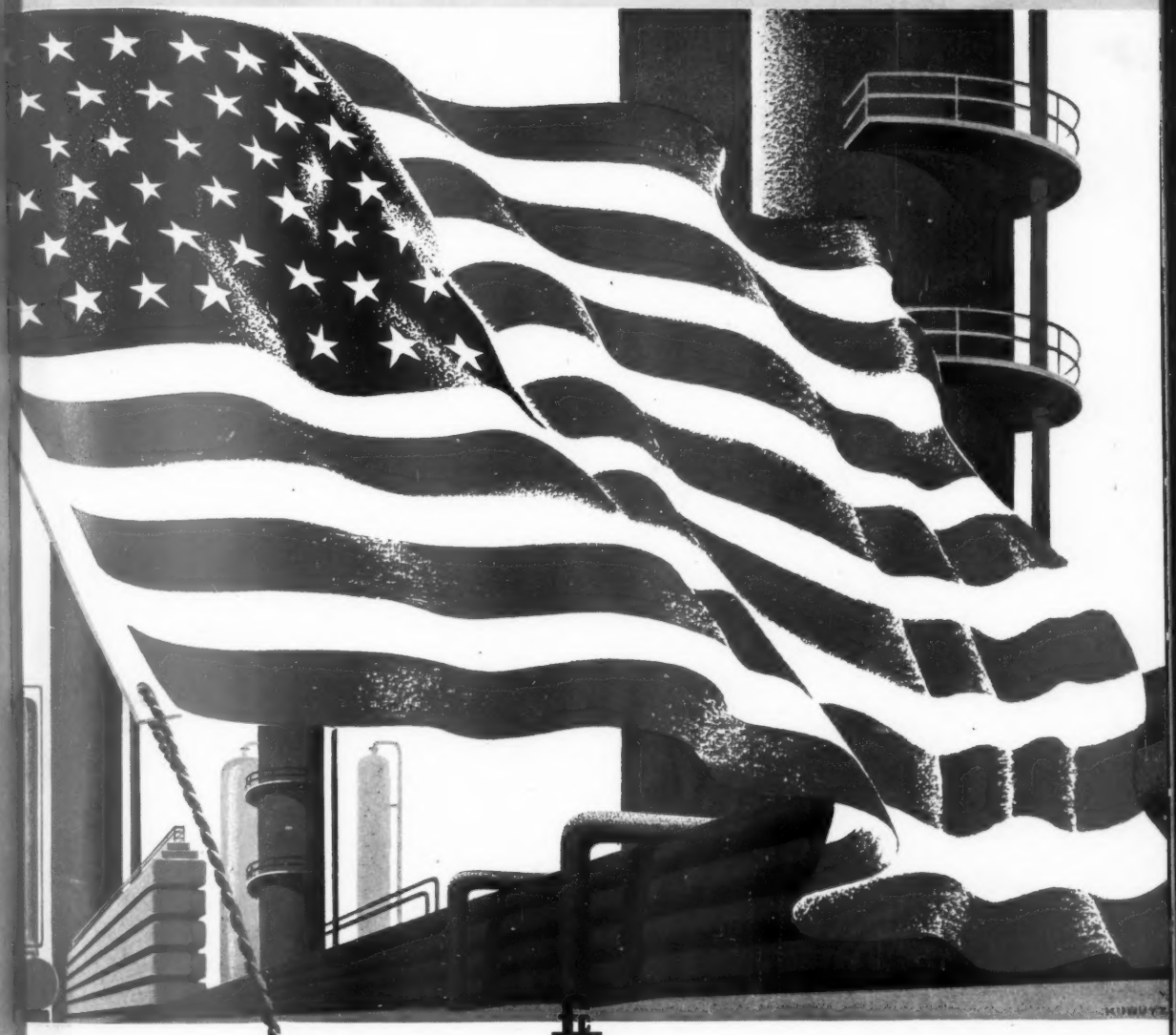
the OIL AND GAS JOURNAL



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Panel board control of constituents entering into magnesium manufacture called for EMCO Orifice Meters.

BUTADIENE
A necessity in man-made rubber, the flow of butadiene is here controlled by a special Empire Meter.

MEASUREMENT and CONTROL SERVING THE WAR PRODUCTION FRONT

A large share of this company's recent production has been war goods. Items built in the various factories included armor piercing shot, oxygen regulators for combat and bombing planes, training devices for aircraft personnel, bomb tail fuzes, aircraft instruments, airplane heater controls, fire control motors for anti-aircraft guns, a gear mechanism for fuzes, axle members for trucks and guns, special ejector valves, hubs for tanks, plus a variety of miscellaneous parts for other prime contractors.

In addition to these direct instruments of war, a majority of our peace-time products are filling important assignments in and around war industry. Some of the applications are pictured on this page.

PITTSBURGH EQUITABLE METER CO.
MERCO NORDSTROM VALVE CO.
Pittsburgh 8, Pa.

STEEL MILLS
These EMCO Regulators and Nordstrom Valves control coke oven gas flow in a steel mill.

CHEMICAL PLANTS
Pittsburgh Piston Meters control batch measurement in many plants in the process industry.

OIL PIPE LINES
Rotocycle Meters and Nordstrom Valves are vital control mediums on many of the Nation's pipe lines.

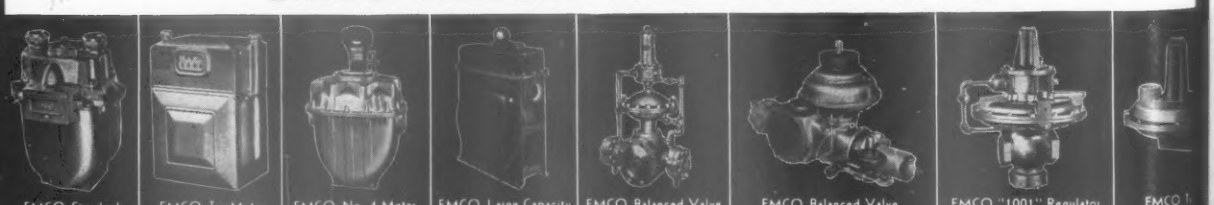
GAS DISTRIBUTION
Extension of gas lines to serve war industries required m EMCO Meters and Regulator Nordstrom Valves.

SYNTHETIC RUBBER
Thousands of Nordstrom Valves are providing the necessary controls on lines in synthetic rubber plants.

WATER UTILIZATION
Ample supplies of pure water are needed for war industry and its workers. Pittsburgh-National Meters help account for war-time water utilization.

SHIPYARDS
EMCO Pilot Loaded Regulator and Nordstrom Valves are here being used to control gas flow to a large shipyard.

EMCO METERS AND REGULATORS



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EMCO Balanced Valve Regulator with EMCOLOADER

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the OIL AND GAS JOURNAL

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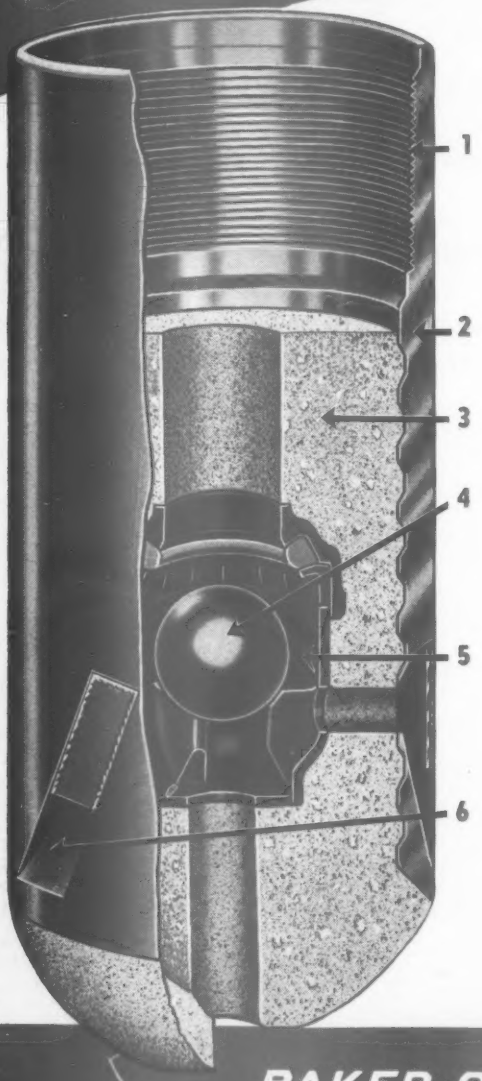
What's in Your Knowledge Box?



If you are connected with the drilling or production end of the oil business, there are certain facts about this important piece of equipment which should be in that portable "knowledge box" you carry around. First-time cementing success often depends upon the use of this unit, and it is *always* your best bet for a good, permanent cement job.

All set? Get your pencil and open up that "knowledge box." You score 80% by correctly answering 6 questions; 85% for 7 answers; 90% for 8; 95% for 9; 100% for 10 right answers. Correct answers are at the bottom of the page, but check *all* questions before you look.

1. This device is a: (a) Core Barrel ☐ (b) Baker Model K Cement Retainer ☐ (c) Baker Cement Wash-Down Whirler Float Shoe ☐ (d) Cement Plug ☐

2. Arrow 1 indicates threads for attaching to: (a) Drill Pipe ☐ (b) Any specified casing ☐ (c) Bottom of junk basket ☐ (d) Any perforated liner ☐

3. Arrow 2 points to the: (a) Seamless steel shoe ☐ (b) Aluminum housing ☐ (c) Core barrel body ☐ (d) Case of magnesium alloy ☐

4. The purpose of this Bakelite ball, Arrow 4, is to: (a) Seal off when pump pressure is applied ☐ (b) Disintegrate when contacted by cement slurry ☐ (c) Prevent reverse movement of slurry ☐ (d) Prevent movement of slurry out of bottom hole ☐

5. The Valve Cage (Arrow 5) is made of: (a) Alloy steel ☐ (b) Vulcanized rubber ☐ (c) Aviation aluminum ☐ (d) Plastic formed from synthetic resins ☐

6. This opening (5) insures: (a) downward whirling of cement slurry ☐ (b) Easy entry of oil ☐ (c) Large volume of reverse circulation ☐ (d) Speed in picking up junk ☐

7. Cement is used here (arrow 3) because: (a) It resists abrasion when oil enters tubing ☐ (b) It has great strength, but is easily drilled out and circulated away ☐ (c) It absorbs gas, thus reducing the gas/oil ratio ☐ (d) It is harder than cast iron ☐

8. This complete unit is often helpful in: (a) Taking better cores ☐ (b) Directional drilling ☐ (c) Removing bridges while running casing in the hole ☐ (d) Locating water zones ☐

9. For successful "first-time" cementing jobs, this unit should be used: (a) Only in wells over 10,000 feet deep ☐ (b) On casing up to 5-inch O.D. ☐ (c) Where no water trouble is anticipated ☐ (d) For cementing practically every string of casing ☐

10. You can secure full details on this product, and helpful suggestions on better cementing by: (a) Looking on Page 303 of the 1944 Composite Catalog ☐ (b) Contacting any Baker representative ☐ (c) Writing to Box 127 Vernon Station, Los Angeles, California ☐ (d) Securing a copy of the Baker 1944 Catalog ☐

BAKER OIL TOOLS, INC.

Houston - LOS ANGELES - New York

Trends

Crude-Oil Production
By States — Page 99

CRUDE-OIL STOCKS 230,565,000 bbl. as of June 17—down 725,000 bbl. One year ago 243,516,000 bbl.

GASOLINE STOCKS 85,268,000 bbl. as of June 17—down 1,643,000 bbl. One year ago 79,591,000 bbl.

RESIDUAL FUEL-OIL STOCKS 52,017,000 bbl. as o June 17—up 796,000 bbl. One year ago 66,931,000 bbl

GAS OIL AND DISTILLATE STOCKS 34,137,000 bbl as of June 17—up 468,000 One year ago 31,751,000

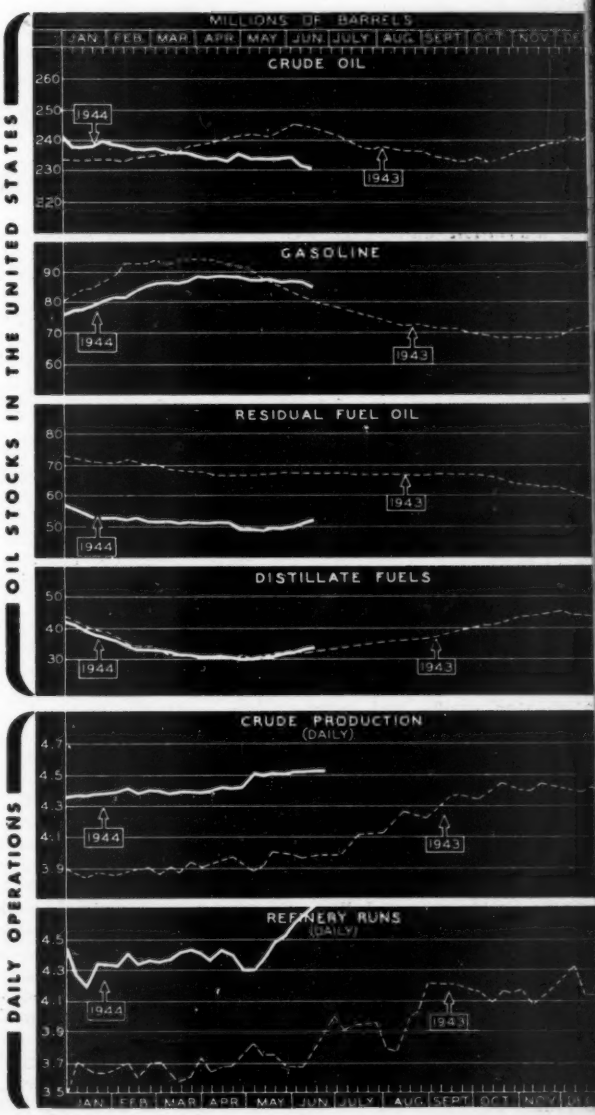
CRUDE-OIL PRODUCTION 4,584,370 bbl. daily aver age week ended June 24—up 15,470 bbl. Year ag 3,975,085 bbl.

REFINERY RUNS 4,752,000 bbl. daily week ende June 17—up 82,000 bbl. Year ago 3,899,000 bbl.

DESPITE the efforts of the Government and private operators to expand crude-oil output, Canada is more and more dependent on outside supplies. Since the Dominion for years has looked to the United States for 70 or more per cent of its total oil imports, failure to increase production since Pearl Harbor except in the military area of the Northwest Territory, has added to the war burdens of operators in this country. There is no official information on production in the Fort Norman area of the Northwest Territory, an activity which is part of a complete military operation largely financed by the United States Army. The objective has been to develop sufficient production in the Fort Norman field to support a 5,000-bbl. refinery at Whitehorse and a smaller refinery operation in the field. Reports indicate that current production in the field and crude oil in storage can maintain the maximum operation through the summer months if necessary.

THIS Northwest Territory petroleum operation has no significance so far as contribution to Canada's petroleum needs is concerned, and will have little importance after the war unless transportation facilities to the south are established. This leaves Canada dependent on existing supplies, largely located in the province of Alberta. During the first 4 months of this year, according to official reports released last week, Canada's crude-oil output totaled 2,948,251 bbl., a decline of 8.8. per cent compared with the same period in 1943 and 18 per cent under the first 4 months of 1942. This year's decline is accounted for by the reduced output of the limestone wells in the Turner Valley field, which furnishes 90 per cent of the Dominion's crude-oil production. No new pools of importance have been found.

AS in the United States, due to war restrictions, complete information on Canada's military and civilian petroleum requirements is not available. During the first 4 months of this year gasoline demands in Canada increased 14 per cent over those of the same period in 1943. The consumption of tractor fuels and light distillates also increased, with a 35 per cent gain in residual fuel oils. The overall increase for these principal products was 17 per cent. These data and other information indicate that Canada at this time is dependent on imports for at least 80 per cent of its petroleum requirements. Annual prewar petroleum consumption was at the rate of approximately 50 million barrels.



Steps Taken to Meet Emergency Calls for 100-Octane Gasoline

by Henry D. Ralph

WASHINGTON. — A heavy and unprograмed drain on 100-octane pplies created by the invasion and g increase in European air activity is caused the Army and Petroleum dministration for War to take a ries of emergency steps to increase eliveries of aviation gasoline to Engnd by every means possible during e next 8 or 10 weeks.

Presidents of oil companies making 00-octane met in Washington June and discussed with PAW and Army fficials all means of increasing outut even by small amounts over a mporary period.

This action followed up telegrams ecently sent by PAW to all refiners equesting speed up in production of rade 130 fuel and of components, inuding butylenes, isopentane and isoutane. Efforts are being made to reistribute supplies of components so hat alkylation and other aviationuel plants can be pushed beyond capacity during the summer. PAW offiials believe that many refineries hich may be meeting their own chedules could produce extra comonents for alkylation elsewhere if dditional effort and ingenuity are sed.

New Plants Scheduled

By fall, several new 100-octane lants are scheduled to come on tream and the programed supply ill be up to or above anticipated ilitary demand after this summer's mergency drain has been met and attlefront stocks are again up to adeuate working levels.

The current all-out air effort has esulted in heavy reductions of comat-theater stocks and commanding enerals are cabling for increased hipments of aviation gasoline. Army opes to ship up to 50 per cent more uel than previously estimated in ome of the more active theaters durng the next 2 or 3 months.

As part of this program the rubber irector, at the request of the Army nd Navy, has directed that 400,000 bl. of butylenes be diverted from utadiene production into 100-octane etween now and September 1. This olume of butylenes will make possile an increase of about 1,000,000 bbl. f aviation gasoline, or only about 3 er cent of the program, but the conribution is considered highly imortant.

Butadiene plants affected are those of Cities Service Refining Corp. at Lake Charles, La.; Humble Oil & Refining Co. at Baytown; Neches Butane Products Co. at Port Neches; Phillips Petroleum Co. at Borger; Shell Union Oil Co. at Torrance, Calif.; Sinclair Refining Co. at Houston, and Standard Oil Co. of Louisiana at Baton Rouge. At these plants much of the butylene scheduled for butadiene will be diverted to other refineries for alkylation wherever facilities and isobutane can be found or in parts of the feed-stock purification sections of these plants themselves.

Rubber Director Bradley Dewey said this would not interfere with the synthetic-rubber program because alcohol butadiene plants will continue to operate above capacity even at the expense of maintenance. The stockpile of crude synthetic is above schedule because tire-manufacturing plants lack manpower to consume as fast as anticipated, and the proved ability of petroleum butadiene plants to operate successfully will make up the loss this fall if sufficient butylenes are available then.

Recently alcohol has been providing 60 per cent of the butadiene and petroleum 40 per cent. During July and August the ratio will be 70-30, but during September it is planned that the ratio will be alcohol 45 per cent and petroleum 55 per cent. The 400,000 bbl. of butylenes diverted would produce about 30,000 tons of butadiene but Dewey said the tire-manufacturing program will not suffer. Some ethylbenzene from styrene plants will be also diverted to aviation gasoline.

Petroleum Priority Rules Are Simplified

WASHINGTON.—A revised form of preference rating order P-98-B was issued by the War Production Board June 26, greatly simplifying the priority system for petroleum operators.

Requests for priority assistance and reports to the Petroleum Administration for War are greatly reduced, and much red tape and paper work are eliminated.

Procedure has been changed to eliminate the need for petroleum operators to submit to PAW information copies of delivery orders for other than controlled materials.

The new order now assigns preference ratings and allotment symbols for material to be used in those small operations which are permitted by petroleum administrative orders to be undertaken without specific authority. This applies to special production operations, natural-gasoline recovery, transportation and refining, and relieves the industry of the clerical burden of filing either a Form WPB-541 or a PAW Form 30 requesting priorities assistance for such small operations in those industry branches.

The procedure for securing priorities assistance for large projects has been completely reshaped into a new PAW Form 30, which eliminates the need to furnish a detailed list of all materials and equipment required for the project. Controlled materials needed will be reported only as an estimated summary, and instead of receiving a "bank credit" type of allotment, operators will be authorized to use an allotment symbol.

Refiners Urged to File Project Plans

WASHINGTON. — Anticipating the time when materials and manpower may be available for construction projects other than those urgently required for the war, the Petroleum Administration for War has asked refiners to submit applications for priorities for new equipment and facilities which they would like to install as soon as possible.

Without making any prediction as to when such relaxation of restrictions may be possible, PAW pointed out that whenever that time comes it will give preference in consideration to the first fully detailed applications to be filed.

Refiners are invited to submit applications particularly for projects which will improve efficiency and produce better yields or higher quality, especially of petroleum war products, and also for utilization of sour crudes, for additional products storage, and for research and development facilities. It is contemplated that facilities of this sort will be constructed without assistance from the Government such as financing, product purchase contracts, or special amortization certificates for tax purposes.

Reports No Longer Needed For Well Abandonment

Oil operators may now abandon any well without giving prior notice to the Petroleum Administration for War, Deputy Administrator Ralph K. Davies announced last week.

Record Production Quota Assigned

WASHINGTON.—A production rate of 4,907,700 bbl. daily, another all-time peak in petroleum output, was assigned last week for July in the regular monthly quotas issued by the Petroleum Administration for War.

Rate of production certified for District 3, the six southwestern states, was increased by 31,600 bbl. daily. Texas received a 33,000-bbl. per day increase as contrasted with minor decreases for Mississippi and Arkansas.

Production quotas certified to the eastern, midwestern and Rocky Mountain states, Districts 1, 2 and 4, were reduced to conform with decreased productive capacities as indicated by actual trends of output.

Assigned Rate Raised

California's assigned production rate was raised 6,800 bbl. daily more than the certification for June. Major portion of the increase is attributable to the completion of new wells, recompletions, and the reconditioning of old producers.

The July production rate certified by PAW is a net increase of 20,600 bbl. daily over the previous high for June. July is the fourth consecutive month in which the certified production figures have exceeded the totals certified for the previous month.

The total production quota of 4,907,700 bbl. daily includes an estimated output of 301,600 bbl. daily of natural gasoline, condensate and similar products, an increase of only 100 bbl. per day from the June calculation.

PRODUCTION RATES IN BARRELS PER DAY, JULY 1944

	Certified total petroleum liquids	Estimated natural gaso. and condensate
District 1:		
New York	12,800	.....
Pennsylvania	41,800	800
West Virgina	14,000	5,200
Total	68,600	6,000
District 2:		
Illinois	226,500	11,500
Indiana	14,600	...
Kansas	279,000	5,000
Kentucky	24,200	2,200
Michigan	51,200	200
Nebraska	1,000	.....
Ohio	8,800	200
Oklahoma	359,000	27,000
Total	964,300	46,100
District 3:		
Arkansas	82,500	4,500
Louisiana	395,000	45,000
Mississippi	41,000	.....
New Mexico	118,000	5,000
Texas	2,204,000	140,000
Total	2,840,500	194,500
District 4:		
Colorado	7,400	.....
Montana	24,700	300
Wyoming	98,000	4,000
Total	130,100	4,300
District 5:		
California	904,200	50,700
Total U. S.	4,907,700	301,600

A. P. Frame to Direct PAW Refining Division

A. P. FRAME

A. P. Frame, vice president of Cities Service Refining Corp., has agreed to join the Petroleum Administration for War as director of the refining division about August 1, filling the position vacated June 15 by E. D. Cumming.

Frame has been employed by Cities Service affiliates since 1924 when he joined Empire Refining Co., Ponca City, Okla. He was transferred to Empire's offices in Tulsa in 1927 and, a year later, became superintendent of the Crew-Levick refinery at Petty Island. In 1938 he was transferred to the refinery engineering department at New York offices of Cities Service and remained there until his election as vice president and chief engineer of Cities Service Refining Corp. which has constructed and started operation of a completely new refinery at Lake Charles, La.

San Caja Development Wells Authorized by PAW

HOUSTON. — Authorization has been issued by W. M. Averill, director in charge of District 3, Petroleum Administration for War, for the drilling and completion of a total of five wells in the San Caja condensate field, McMullen County, Texas. Operators may use the required material provided each new well is at least 2,640 ft. from every other drilling or producible well.

Synthetic-Fuel Study Curbed by Cut in Funds

WASHINGTON.—Plans for experimental work in developing synthetic fuels by the Bureau of Mines will be revised and sharply curtailed in view of a cut in the Interior Department's appropriations item for the project as passed last week by House and Senate. An appropriation of $5,000,000 was passed for the coming fiscal year, this a reduction of $3,000,000 from the original recommendation.

Even more limiting, in view of the bureau, was elimination of a provision allowing the bureau to make contractural obligations up to $30,000,000, the authorized limit set in the synthetic fuels bill. This, in effect, puts the project on a 1-year basis and rendering it impossible for the bureau to schedule a long-term project of experimentation and development.

PAO-11 Revised to Satisfy Protests

WASHINGTON.—Rapid progress is being made by the Petroleum Administration for War toward revising drilling restrictions of PAO-11 along the lines proposed by the recent conference of District 3 producers in Houston.

Deputy Administrator Davies hopes to meet fully all seven points (see pages 52 and 53, June 24 Journal) requested at the Houston meeting, and PAW production and legal experts have been working intensively on the required revisions in the order. At midweek the job was virtually completed, but because the new orders must be cleared and issued by the War Production Board the actual date of promulgation was uncertain.

Gillespie to Represent Illinois on Compact

OKLAHOMA CITY.—Louis F. Gillespie, Springfield, Ill., has been appointed to represent Gov. Dwight H. Green of Illinois on the Interstate Oil Compact Commission, it was announced here this week by Charles L. Orr, compact secretary. Gillespie succeeds Samuel F. Peterson as Illinois' representative but the latter continues as a member of the compact committees on research and coordination and on regulatory practices. Gillespie has practiced law at Springfield since 1924 as a member of the firm of Gillespie, Burke & Gillespie.

Alaska Exploration Program Modified

WASHINGTON. — Government exploration for oil in Alaska will be curtailed but not discontinued by the elimination of special funds earmarked for test drilling and exploitation in the War Department and Interior Department appropriation bills as passed by Congress last week.

The U. S. Geological Survey already has several parties working along the South Coast of Alaska.

Drain on Technical Manpower Is Growing More Serious, Boyd Says

WASHINGTON. — Serious impairment of petroleum supplies will result from any additional drain on trained technicians in the industry, W. R. Boyd, Jr., chairman of the Petroleum Industry War Council, warned this week on the eve of another change in manpower regulations.

Induced principally by demands of draft boards for military manpower, coupled with lack of college graduates in specialized sciences, the petroleum industry is finding it increasingly difficult to keep pace with war requirements because of decreased professional personnel, the PIWC chairman declared.

"A survey of almost a score of oil companies," Boyd disclosed, "showed they are operating with about 8,000 trained technicians. A substantial number of this trained manpower is now subject to the discretion of Selective Service—a small group in military figures but a mighty important group in their present jobs.

"The companies report that practically all of their technical men are on essential war work. The industry has explored the possibility of replacement by women and older technical men from nonessential industries and women have largely replaced men at subprofessional positions. Little relief from the technical manpower shortage has been found through replacement by older men from nonessential industries."

Boyd emphasized the findings of a special study made by PIWC's technical advisory committee for the petroleum administrator dealing with the present plight of petroleum's war-wracked refining technology.

Findings of Committee

The TAC committee reported it found:

"Nineteen oil companies with 117 refineries, representing about 75 per cent of the capacity of the refining industry and most of the production of critical war materials, employ a little over 100,000 persons in research, development and manufacturing. This is about 1 per cent of those engaged in agriculture. Less than 8 per cent or 7,900 of these are trained technical employes who are fully utilizing their professional skills for the war effort in the field of chemistry, physics or engineering. Of the entire team of technical personnel, more than 97 per cent are working on war problems, including essential civilian supply, and of the few remaining most are so highly specialized in experience and training as to preclude adjustment to other than their normal activities in any event."

The PIWC committee in its manpower study found the companies coming under its survey operating at present with a 30 per cent decrease in their professional personnel when the exhaustive demands of war are compared with normal peacetime pursuits of the petroleum industry in specialized products.

Truck Rationing Duties Assigned to ODT

WASHINGTON.—Rationing of new trucks and other commercial motor vehicles has been turned over to the Office of Defense Transportation, the War Production Board announced last week with the issuance of WPB Direction 36.

The new rationing plan became effective July 1, under ODT General Order 44. It is expected that this change in the rationing machinery will result in more expeditious handling of applications.

Under the WPB's 1944 truck production program, approximately 89,000 medium and heavy trucks will be made available, as manufactured, through ODT General Order 44, WPB said.

In an ordinary year the American market alone requires approximately 600,000 new trucks, and as there was practically no production during 1942 and 1943, a large backlog of orders has been built up, WPB explained.

Alex D. Bailey Nominated to Head A.S.M.E. Next Year

PITTSBURGH. — Alex D. Bailey, vice president of Commonwealth Edison Co., Chicago, is the nominee for president of American Society of Mechanical Engineers for 1945, it was announced by George Nicastro, chairman of the nominating committee.

Nominations for vice president are: David Larkin, vice president and general manager Broderick & Bascom Rope Co., St. Louis; John E. Lovely, vice president Jones & Lamson Machine Co., Springfield, Vt.; Thomas S. McEwan, vice president McClure, Hadden & Ortman, Inc., St. Louis. Nominated as managers are: Daniel S. Ellis, vice president in charge of manufacturing, Lima Locomotive Works, Inc., Lima, Ohio; Arthur J. Kerr, district manager of sales Pittsburgh Equitable Meter Co., Tulsa; Herman George Thielscher, mechanical engineer, Potomac Electric Power Co., Washington.

Election will be conducted by mail, the balloting closing September 26, 1944.

Sinclair Planning to Build Refinery in Venezuela

NEW YORK. — Plans for construction of a 35,000-bbl. refinery in Venezuela for production of 80-octane gasoline and Navy diesel fuel oil were announced last week by Sinclair Oil Corp. The plant, it was said, is to be constructed on land owned by Sinclair near the Fuerta de la Cruz terminal of Venezuelan Oil Corp. and will include crude and cracking stills, acid plants, an electric generating station, housing for employes, a hospital and school. Building of the refinery, Sinclair said, will depend on available material and shipping.

The company's announcement was made following inquiries concerning the formation of two Venezuelan subsidiaries — Sinclair Oil Co. of Venezuela and Sinclair Refining Co. of Venezuela.

McEntire Youngest Man to Head Kansas Commission

Richard B. McEntire's recent appointment as chairman of the Kansas Corporation Commission by Gov. Andrew F. Schoeppel has been acclaimed as recognition of his efforts as general counsel of the commission. He is believed to be the youngest man ever to head the Kansas commission, and the only person who ever worked his way up to a commission position after starting in the ranks of the staff.

He was graduated from the Washburn University Law School in 1934 and was admitted to the practice of law in June of that year. In April 1938, he became an assistant special attorney for the Kansas commission. During the summer of 1939 he was appointed special attorney, handling motor-carrier and speculative securities matters, and in August 1940 he was promoted to secretary.

McEntire is active in the work of the legal committee of the Interstate Oil Compact Commission as the Kansas representative.

THIS WEEK

PRODUCTION—Another all-time peak of 4,907,700 bbl. daily certified for July, including natural gasoline and condensate. . . . ¶Texas qualified to increase production 170,000 bbl. daily, Railroad Commissioner Thompson asserts. . . . ¶California quota raised 6,800 bbl., Texas increased 33,000 bbl. in July quotas. . . . ¶Removal of preference from most desirable crudes returns flexibility to state regulation. . . . ¶Industry alarmed over possible competition from Department of Agriculture which may elect to operate foreclosed farm and ranch lands. . . .

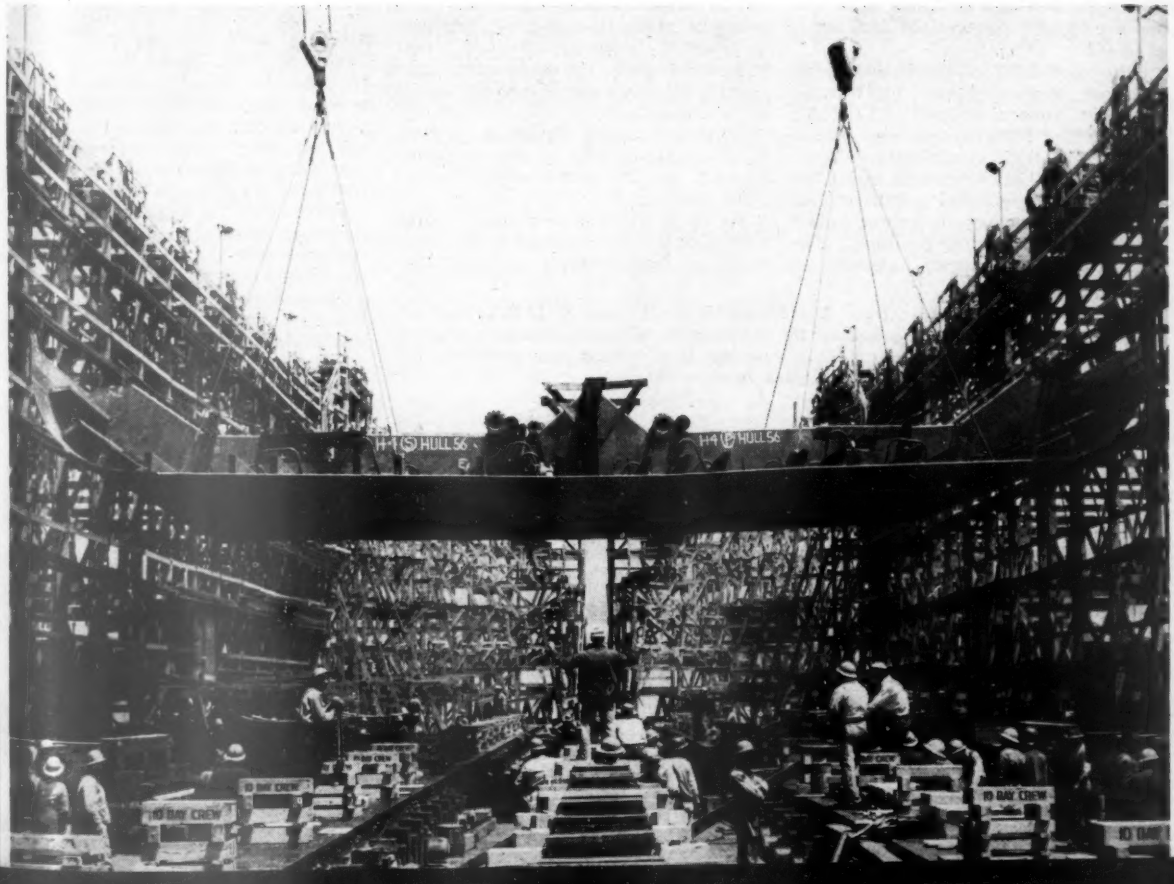
DRILLING—Spacing regulations of PAO-11 are being revised—to meet 7-point proposal of District 3 operators. . . . Modified order may be promulgated within few days, depending on speed of clearance with WPB. . . . ¶Preliminary returns to survey show 20 to 30 per cent rise anticipated in drilling activity last 6 months. . . . ¶Exploration and exploitation programs gaining momentum each week in southeastern states. . . . ¶Keystone area of Winkler County, Texas, with two potential pays, scheduled for intensified activity. . . .

REFINING—Plant operators implored to produce every possible drop of aviation gasoline and its components during next 2 months. . . . Exceptionally heavy drains on stockpiles in war theaters present immediate, critical emergency. . . . Refiners meet with PAW and War Department officials to map operations for meeting conditions. . . . ¶Butylenes shunted from synthetic-rubber plants as one tangible move. . . . Completion of new 100-octane plants will permit return to programed operations of all manufacturing facilities this fall—at least that is the plan as now visualized. . . . ¶Sinclair planning refinery in Venezuela. . . .

PRICES—Action on stripper-well subsidy appears less imminent. . . . Kentucky producers urge permanent differential between high and low cost production, to keep small pumpers on active list. . . . ¶Thirteen changes made in OPA ceiling prices on fuel oil and gasoline, mostly local in scope. . . .

FOREIGN—Petroleum Administrator Ickes reasserts that Arabian pipe-line project is on the long-range petroleum agenda. . . . Direct assertion avoided on whether Government or private companies will build and own line but it is still prominent in future planning. . . . Further conversations with British awaited for final consideration of policy. . . . ¶New discoveries and field development improve prospects for Colombia's Barco Concession. . . .

This keel laying shot at Marinship Corp. yard in California is symbolic of the emphasis currently placed on tanker construction to meet the vastly expanded petroleum demands in European and mid-Pacific theaters of war where Allied forces have launched crushing offensives



Independents Warned of Conflict With Foreign-Petroleum Program

by Max L. Spray

LEXINGTON, Ky.—The domestic oil producer is facing a definite, important problem and one which must be solved. That problem is whether the policy of the United States Government shall be one of encouragement to the development of the oil reserves of this nation or a continuation of the present policy of making money, manpower and materials available to the oil industry in foreign countries, Ralph T. Zook asserted here June 24.

Zook, president of Independent Petroleum Association of America, was the featured speaker at the annual banquet of the Kentucky Oil and Gas Association which concluded the 2-day meeting.

A fair and just price that will compensate for greatly increased operating and development cost, prevent abandonment of small wells, increase secondary-recovery operations and really furnish the incentive for a wildcatting program of the magnitude necessary to find not only pools in known producing areas but to open new regions where oil is not now being produced, is essential, Zook emphasized.

Other problems of the independent producer were discussed by Russell B. Brown, general counsel of I.P.A.A., who warned "There are mine fields ahead" and then graphically told of the fight for better understanding on the part of the general public and of the need for economic improvement for the independent producer. He praised the Kentucky association members for their help to bring about these objectives.

Brown criticized the view of independent producers as outlined by "self-styled economists who hold theories of government that do not square up with those which we and the majority of our people hold."

He compared government to an umpire, but said that the referee should stand in the middle of the diamond and make the decisions—not push the pitcher or batter aside and take over that role.

"The umpire has moved far out of his original role," he said. "At the moment the Army, the Navy, the Department of Interior and the Department of Agriculture are engaged in the oil-producing business."

He told of the Army's Canol project in Alaska, the Navy's plan to drill in Alaska, the Department of Interior's agreement with the Army in regard to wildcatting in Alaska and of the Interior Department's experiments in the production of liquid products from coal and oil shales.

The Department of Agriculture has recently gone into the oil business as lessor of its lands, Brown said, and he warned that this department may decide to start development on its own account.

He told of the appropriations "bouts" in Washington and of the confusion created by the demands of "mushroom agencies."

He cited the free-and-easy lending policy of the farm cooperatives, their freedom from income taxation and said that, "blessed in their activities by a branch of the federal Government, this form of competition with private industry can become masterful."

Brown warned that even now some agencies are bringing forth the cry that there will be a long postwar period when it will be ruinous to let "the people go back to their undirected way of doing things."

Recognizably unimportant restrictions have not been fought while the industry was getting on with the necessary war work the speaker said, citing the petroleum administrator's repeated promises of aid in ending restrictions when the war ends.

He praised members of Congress for placing restraints in the recently signed naval-reserves law and urged every citizen to keep closer to his elected representatives.

The association went on record as recommending a price differential in favor of crude oil from stripper wells over that from flush wells and said that this differential should be not less than 50 cents a barrel with this to be paid out of a compensating price of refinery products. The association instructed its executive committee to work with officials of the National Stripper Well Association in completing the differential price plans.

The recommendation was adopted after a lengthy discussion led by Paul G. Blazer of Ashland, A. V. Hoenig of Tulsa and others.

Blazer, in the discussion said that profits of flush wells should be used to maintain them when they become stripper wells — a sort of "Old Age Pension" plan. Blazer had proposed that the cost of such a program should be carefully studied with the view of possible taxation or subsidy to secure the necessary funds and careful apportionment to all wells in order to maintain operation of the strippers.

Zook called for a crude-oil price not based on political expediency but one that will give the oil producer his replacement cost and a fair profit.

He analyzed the foreign-oil situation saying that there are reserves in the Middle East of sufficient size to supply world requirements many times over.

"These reserves can be produced at a cost which would threaten the existence of the domestic oil producer if placed on the market in excess of demand and in direct competition with oil from the United States," he warned.

M. A. Arvin, of Owensboro, was elected president of the association, succeeding N. W. Shiarella, of Owensboro. Vice presidents chosen are P. C. Van Gilst, of Ashland; M. G. Powers, of Huntington, W. Va., and K. Z. Wilking, of Owensboro. E. L. McDonald, of Lexington, was reelected secretary and J. C. Preston, of Owensboro, was reelected executive secretary-treasurer.

New officers of the Kentucky Oil and Gas Association are: (seated) E. L. McDonald, secretary; P. C. Van Gilst, vice president; N. W. Shiarella, executive committee member; M. A. Arvin, president; (standing) M. G. Powers and K. Z. Wilking, vice presidents, and J. C. Preston, executive secretary-treasurer

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

Over the Hump

A STUDY of the latest Bureau of Mines reports covering refinery activities, including comparisons with operations a year ago and those at the time of Pearl Harbor, will reveal in part the war accomplishments of 450 refineries and several hundred natural gasoline plants in this country. The emergency has no manufacturing parallel in which continuous and expanding operations have been maintained with wide variations in consumer requirements. As explained by a Washington official, refiners, as a group, are now definitely "over the hump" in the support of the war program.

The April report of the bureau, released this week, explains that crude-oil runs to stills averaged 4,441,000 bbl. daily, an increase of 679,500 bbl. over April, 1943. The ability of refiners to absorb steadily increasing quantities of crude oil at their plants, in most cases with little or no new equipment installed for that purpose, has been outstanding.

But what operators are doing with the raw material in their processing operations is more remarkable than the expansion in crude-oil capacity. The 18 per cent gain in crude-oil runs to stills in April was accompanied by a 27 per cent increase in gasoline output. This was accomplished with a 3.8 per cent increase in gasoline yield from crude oil. Without that gain it would have been necessary to increase crude runs an additional 475,000 bbl. daily, an expansion which would have been impossible without major additions to plant and transportation facilities and a corresponding rise in field production. The enlarged motor fuel requirements have been supplied largely through a reduction in yields of residual fuels. Demands for all oils have been provided in full.

Refiners have bridged a large part of the gap between supply and demand by adding to the output of cracked gasoline, the gain in April over the same month of the previous year being 6,228,000 bbl. Most of this growth consisted of cracked products used in the blending of 100-octane gasoline, without which there would have been no invasion of France and no Allied offensives anywhere.

Furthermore, in evaluating this achievement it is necessary to keep in mind that the production of 100-octane ingredients is a more difficult processing operation than the manufacture of civilian grades of motor fuels. In general, yields are less and losses greater, and more operating skill is required.

While emphasis has been placed on the refining of aviation fuels—the output of which will total 500,000 bbl. daily by the end of this week—and the production of butadiene for synthetic rubber, the war program of the industry's manufacturing division has not stopped there. The manufacture of these two products accounts for less than a third of the total petroleum now being supplied the armed forces. In fact, the so-called nonessential uses of petroleum are now so restricted that virtually every barrel of finished product supports the war effort. This situation in effect has meant that most refineries have maintained their prewar output in addition to the emergency operations.

The long-range significance of what has been accomplished at refineries over the past 2½ years will be apparent when peace returns and complete reports can be made. Analyses at that time will show that the industry's manufacturers have greatly strengthened the foundations upon which future petroleum operations are to be based.

Barco Revealing True Productive Potentialities

Discovery on Tibu Structure Enhances Concession's Value

Information for this report on current operations and status of development in the Barco Concession was gathered on a recent trip through South America by two representatives of the Journal and its affiliated publication, Petroleo Interamericano. It is based on first-hand information from men directing the operation who have an intimate knowledge of the area.

FOR almost 40 years the incredible Barco lands of Colombia have caught the imagination of oil men throughout the world who know it to be a place of high adventure, jungles, Indians, orchids, alligators . . . and some oil.

It has not been until recent years, however, that the true oil-producing potentialities of this concession have become apparent. Barco has gone through several extremes in its publicity. First, when Colombian Petroleum Co. 2 Petrolea came in as discovery well in 1933, flowing 2,500 bbl. of high-gravity oil daily from a depth of only 708 ft., a period of optimism began. Subsequent drilling to this horizon and deeper ones on the same structure served to further establish productivity of the field and led to building of the Barco pipe line on which construction started in 1937 and moved first oil in the fall of 1939. After the Petrolea field began exporting oil, a rapid rate of production decline was experienced, and a period of realism began during which it was apparent that if additional oil was not found on the huge concession it would, in some respects, prove disappointing. This was followed by a period of unsuccessful wildcatting through 1940 and 1941 which represented a period of pessimism.

An entirely new phase of operations began at Barco, however, after discovery of production on the Tibu structure (formerly referred to as the Tres Bocas-Socuavo area). The limited but continual drilling possible at Tibu during the last 2 years has served to suggest a new and higher valuation on the ultimate production of the concession. Hence, all previous records need now be reviewed and revised.

Before considering the new and very significant developments at Tibu, a review of the other producing areas on the concession seems proper. The accompanying map shows outline of this 460,000-acre block of selected lands, chosen out of the original 1,000,000-acre concession. Also, the map shows location of the three producing areas.

In the Petrolea North Dome, 130 wells have been drilled; 93 are producing today throughout an area of about 4,000 acres. This 46-gravity crude is coming from five different zones of Cretaceous age from 100 ft. down to about 1,600 ft., producing an aggregate of about 11,500 bbl. daily. Accumulated production to date is over 14,000,000 bbl.

The Petrolea South Dome is structurally about the same size as the north dome. Drilling on the crest of this structure has been disappointing. One well has been drilled on the eastern flank where small production has been found trapped behind a fault. Pipe-line outlet has been provided and the well is being exploited. No further drilling on this structure is contemplated.

Carbonera Crude Heavy

The Carbonera field, immediately to the east of Petrolea South Dome, produces a much heavier oil than any other place on the concession (about 25 gravity). Three wells have been completed to date, ranging in depth from 2,234 to 3,359 ft. Initial potentials have been small, averaging less than 100 bbl. per well. Pipe-line outlet is available but production has been used mainly for road building. It is not likely that additional wells will be drilled in this area.

On the extreme north end of the concession is situated the Rio de Oro field. On this narrow tight anticline 13 wells have been drilled; 9 will flow naturally an aggregate potential of about 1,000 bbl. daily of 36-gravity oil from the 1,500-ft. horizon. No pipe line has been built to connect this production to the main line. When materials are available, a small line may be constructed into the Tibu area to connect with the projected gathering system in that field.

Colombian Petroleum Co. of Delaware is owner and operator of the concession. South American Gulf Oil Co. is owner and operator of the pipe line. Stock of the latter company is owned in equal proportions by The Texas Co. and Socony-Vacuum Oil Co., Inc., as is also that of the former except for a minute minority interest. Headquarters offices are maintained in New York City where operations are headed by W. G. Corwin, vice president.

An office is maintained in Colombia's capital city of Bogota, where C. F. Cornell is representative. C. O. Isakson is manager in Colombia for both the producing-refining, and the pipe-line companies, and maintains his office and staff at the town of Cucuta, in the extreme northeast part of the country, some 25 miles south of the concession proper. Accounting, personnel and other activities are carried on at the headquarters office in Cucuta.

A modern camp and office is maintained in the Petrolea field under the direction of Charles L. Clark, field superintendent. Here engineering offices, geological staff, warehouses, etc., are maintained.

Accessibility of Concession

The Cucuta office has been accessible via Pan American's affiliated airline in Colombia, either from Bogota or Barranquilla, although this service to Cucuta recently has been temporarily suspended. The concession is accessible by private company plane (for both light freight and passengers) to the small airports on the concession at Petrolea and Rio de Oro. Also, Petrolea may be reached from Cucuta via narrow-gage railroad and company bus.

In the Petrolea field proper, operations are in the settled stage and most attention is being centered in the fast expanding Tibu area to the northwest. This area is connected to the Petrolea office by blacktop highway, a distance of about 25 miles. Here the jungles are being cleared for construction of one of South America's most modern camps. Already a large workman's camp is completed and others will be added. A warehouse, shops, field geological headquarters, club, mess and dormitories have been built. Later, when materials are available, a modern camp of brick houses for the staff, families and bachelors, will be added. Another airport is under consideration to provide direct connection with Cucuta and other points on the concession. In other words, the jungles of the Barco are slowly being readied for the exploitation program ahead at Tibu.

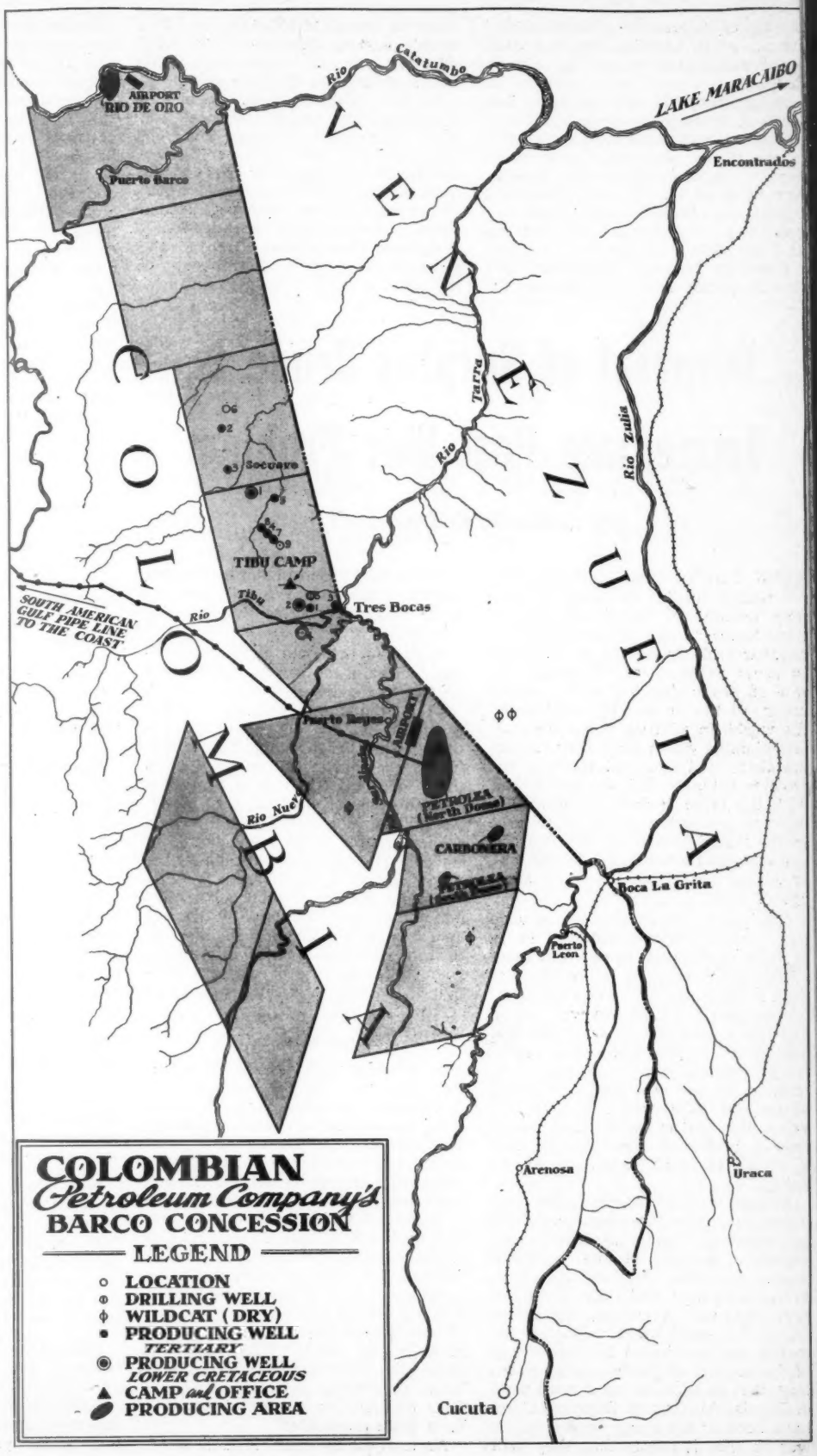
On the accompanying map the spread of producing wells at Tibu will be seen. Six of the eight producing wells are completed in the Tertiary section at about 5,000 ft.; two are com-

pleted in the lower Cretaceous below 9,000 ft.

Tertiary sands occur in a lenticular pattern, and vary from well to well. It has been possible, however, to make some correlations between wells. Saturation thickness varies from 40 to 150 ft. Tres Bocas 1 and 3 and Socuavo 2, 3, 4 and 5 have been completed in the Tertiary zones. Socuavo 7 and 8 are testing and 9 is rigged up. Tres Bocas 5 is drilling. A 4-in. pipe line extends from the Tibu field to the South American Gulf tank farm at Petrolea and commercial production of 4 and 5 Socuavo commenced in the latter part of March and is now about 1,500 bbl. per day. Relatively small quantities of gas are produced from the Tertiary wells, and they will probably need to be produced by some form of artificial lift rather early in their producing life. An area of several thousand acres is probably productive but actual area is by no means defined.

In the lower Cretaceous horizon two wells, 2-A Tres Bocas and 1 Socuavo, have been completed, and another, 4 Tres Bocas, is partly rigged up waiting on material. Socuavo is bottomed at 9,850 ft. and is now shut in with 3,100-lb. casing pressure. Tres Bocas 2-A is bottomed at 9,228 ft. and is carrying 3,500-lb. casing pressure. No actual producing tests of these wells have been made but they are known to be very gassy. Both have produced on short tests considerable 51-gravity oil but 1 Socuavo not sufficient to be considered commercial.

It is too early to speak of proven area in the lower zone since these two wells are located about 8 miles apart and each is near



the top of its portion of the combined structure. In addition, the two wells are separated by a syncline 500 ft. deep.

Accordingly, it will be seen that while it is much too early to attempt a final evaluation on the Tibu portion of the Barco, yet a large area exists here to augment the former productive lands of this famous concession. Before any planned development program can proceed, much new drilling and completion equipment is needed.

Capacity of South American Gulf Oil Co.'s line from Petrolea to the coast is about 25,000 bbl. per day, double current production of 13,000 bbl. per day, of which some 1,500 bbl. is from Tibu Tertiary wells.

In the Petrolea field, Colombian Petroleum Co. operates a small but well maintained topping plant of about 500 bbl. per day capacity. Operating on the 46-gravity crude in the field this refinery is recovering about 39 per cent gasoline with 300° F. end point, and whatever diesel oil is locally needed. The residual is put into the pipe line for movement with crude to the coast.

Disposal of Surplus Crude Is Immediate Post War Problem

by John P. O'Donnell

NEW YORK.—Disposition of a potential surplus of crude oil that may amount to substantial proportions looms as one of the immediate postwar problems of the oil industry. In order to meet war demands, the rate of production has been stepped up in all the producing countries of the world. In addition there are projects planned which, once they are undertaken, will add still more to the postwar potential. It is estimated that, with the latter included, the world's postwar producing potential will be in the neighborhood of 7,500,000 bbl. per day, an increase of 1,800,000 bbl. or 30 per cent from the daily average of 1939.

It is highly improbable that a war-torn, impoverished world will be in position to consume 30 per cent more oil in the first years after the war than it did in the comparatively prosperous year in which the war began. For this reason it seems certain that a substantial cutback in world crude-oil production will be necessary as soon as the war ends and, due to the abruptness with which it may develop, this matter is one that should receive preferred consideration from a group planning international oil policy.

Europe, west of Russia, is the most important of the five continents from an importing standpoint. The largest importing nations of the continent were, in 1938, United Kingdom, France, Germany and Italy. Their imports that year averaged, respectively, 7.5, 5, 3 and 1.5 million barrels per month and accounted for two-thirds of the imports of the two dozen countries that go to make up Europe west of Russia. All four of these countries have been or are being devastated by war so that it seems that they will have neither the means of consuming nor the funds to pay for oil immediately after the war as they did before it.

With the principal market apparently certain to be smaller than in prewar years, the short-term outlook for the producing countries, especially those heavily dependent on exports, is not encouraging. This is definitely the short-term outlook for, on the basis of past history, a continued gain in crude-oil demand may be expected over the years and this gain should resume when some degree of stability is established throughout the world. In the 15 years before the war, world production of crude oil almost doubled to meet the growing demand and it is certain that it will increase, though possibly not as rapidly, in the years following the period of transition from war to normal peacetime conditions.

Estimated Potentials

In arriving at the estimated potentials for the various countries as shown in the accompanying table, several considerations were involved. These included estimates of current production in countries where further substantial change is not anticipated, the effect of development campaigns in countries which have outlets and the probable effect of construction projects, some of which are now under way and some of which are to be launched as soon as conditions permit. Notably absent from the list are two of the Middle East producing areas, Kuwait and Qatar. While both of these, the former particularly, have large potentials, definite plans for their exploitation are not known to have been completed.

An analysis by countries follows:

Argentina. — Production has increased steadily for years and available reports indicate that it has continued to rise at the rate of 5 to 10 per cent annually since the war began. Actually it may be slightly higher than the estimated 65,000 bbl. per day and by the end of the year may be nearer 70,000 bbl. daily. However, domestic consumption is sufficient to consume more oil than Argentina produces so that the effect of an increase here is only to reduce the country's importance as an importer.

Colombia.—Pipe-line capacity of 80,000 bbl. per day and refinery capacity of 15,000 bbl. daily now limit Colombian production to that maximum. Development of the Barco's Tibu area, slowed by equipment shortages, will determine the production rise. Proposed linking of Casabe with the Andian line will offset any decline in Tropical's potential.

Bahrein Island.—Production is not expected to increase substantially in spite of the expanded refinery capacity since the refinery demands may be supplied from the nearby and much larger Saudi Arabian reserves of the affiliated Arabian American Oil Co.

Canada.—Little variation is expected in Canadian production from its present level of approximately 27,000 bbl. daily.

Egypt.—Exploitation of Ras Ghareb, discovered a year before the war, has virtually doubled Egypt's production which is far in excess of internal requirements and therefore this country will become a potential exporter.

Germany.—Under the stimulus of war, production in Germany and occupied countries probably has expanded. What proportion will be available after the war is conjectural but it will not be a significant part of the world total.

Hungary.—Wartime development of Budafapuztsa and Lovasi has raised Hungarian production to a reported 20,000 bbl. daily. This figure is questioned but there is no doubt that production has risen substantially and is well above domestic needs.

Iran.—Expansion of refinery capacity at Abadan will raise the Iranian potential to an estimated 350,000 bbl. daily, easily obtainable from known fields. Refinery capacity will probably limit production but the total potential for the country is vastly in excess of that figure.

Iraq.—Looping of the Iraq line is planned and, it is assumed, will be undertaken as soon as possible. Increased refinery capacity at Haifa and the convenience of the line's terminals to Europe will give Iraq a pro-

ducible potential, with the looped line, of an estimated 150,000 bbl. daily.

Mexico.—Production is again in excess of 100,000 bbl. a day. With its present rehabilitation program, Mexico should be able to produce 125,000 bbl. daily and probably will when markets are open.

East Indies.—Companies which previously operated in the East Indies have prepared to return as soon as they are retaken so that some production may be almost immediately available. If Australian refinery capacity is expanded to supply western Pacific needs, it would provide a convenient outlet for East Indian crude.

Peru.—Peruvian production has been expanded slightly and no great change is expected between now and the end of the war.

Romania.—A marked decline from 1939 is expected in Romania's immediate postwar potential because of already damaged refining and transportation facilities and prospective destruction to producing properties. Extent of the decline is purely conjectural.

Saudi Arabia.—In order to supply expanded refinery capacity now building on Bahrein Island and proposed on the mainland, a large increase in Saudi Arabian production is expected. If the refineries have a combined capacity of 100,000 bbl. daily this would give Saudi Arabia a market for 75,000 bbl. daily. If the now questionable trans-Arabian line were to be installed, the country's marketable potential would be very near 400,000 bbl. daily.

Trinidad.—Increased approximately 15 per cent to meet war requirements but limited largely by refining capacity, Trinidad's rate of production is not expected to vary greatly.

United States.—Production has exceeded the estimated figure but for 1944 as a whole is expected to average 4,500,000 bbl. daily. This amount is expected to be in excess of postwar demand with the result that prewar restrictions on production will have to be reapplied in the immediate postwar period.

U.S.S.R.—Since no official figures are published on Russian production, its rate is also a matter of guesswork. However, the country's obvious need for oil, reports of new discoveries and the known expansion of Ural basin operations indicate that output has risen. In light of the 30 per cent increase in the United States, an estimate of a 25 per cent gain for the U.S.S.R. does not seem out of line. This may provide Russia with an exportable surplus in the postwar era.

Venezuela.—An objective of 1,000,000 bbl. daily has been set for Venezuela. If it is attained it will give the country an exportable surplus of approximately that amount since domestic consumption is normally less than 30,000 bbl. daily. It is quite certain then, even if shipments of heavy fuel to this country do increase, that Venezuela's rate of production will face a cut in the immediate postwar era.

Other countries.—Increases in such countries as Ecuador, India and Brazil and the development of production in others such as Great Britain and China add in a minor way to the world potential and accordingly, detract from the market available to oil exporting countries.

PREWAR PRODUCTION AND POSTWAR POTENTIAL

Country—	1939 daily average	Probable potential	Difference
Argentina	51,500	65,000	+13,500
Bahrein Island	21,000	25,000	+4,000
Canada	21,500	27,000	+5,500
Colombia	65,500	75,000	+9,500
Egypt	12,750	25,000	+12,250
Germany*	26,500	30,000	+3,500
Hungary	3,000	15,000	+12,000
Iran	214,000	350,000	+136,000
Iraq	84,500	150,000	+65,500
Mexico	117,500	125,000	+7,500
Netherlands East Indies†	190,000	50,000	—140,000
Peru	37,000	40,000	+3,000
Romania	125,000	75,000	—50,000
Saudi Arabia	11,000	75,000	+64,000
Trinidad	53,000	60,000	+17,000
United States	3,466,000	4,500,000	+1,034,000
U.S.S.R.	595,000	750,000	+155,000
Venezuela	566,000	1,000,000	+434,000
Others	56,500	72,500	+16,000
Total world	5,717,250	7,509,500	+1,792,250

*Includes all presently occupied countries. †Includes British East Indies.

Venezuela Oil Policy Lauded

CHAPEL HILL, N. C.—Venezuela provides an example of progress in petroleum in sharp contrast with the "regression" of Mexico, said Joseph E. Pogue, vice president of Chase National Bank, New York, and assistant to the chairman of Petroleum Industry War Council, speaking before the Inter-American Institute of University of North Carolina, of which he is an alumnus.

Discussing "Oil and the Americas," Pogue asserted it was Mexico's discouragement of venture capital by expropriation of properties of American and British oil companies that had caused Mexico's tumble from second to sixth place as an oil producer, while Venezuela, encouraging investment of foreign capital, had leaped from thirteenth to third place in oil and was now first in the world in exports. Mexico's loss was "Venezuela's gain."

Latin America has enormous oil-producing possibilities, said the speaker, and encouragement of private capital to develop these resources would be a boon to the various republics.

Private oil companies have invested about $400,000,000 in the petroleum industry of Venezuela, with the result that the cumulative oil production of that country is today 2,600,000,000 bbl., its proven reserve 6,000,000,000 bbl., and the prospects for large future discoveries are promising. Other Latin-American countries that have benefited by foreign capital investment in oil exploration were Colombia, Peru and Ecuador. Others with important oil potentials were being held back by policies of "economic nationalism," examples being Argentina, "which has unceasingly restricted the scope of private enterprise by establishment of a government monopoly," Bolivia and Brazil.

Economic Impact of Oil

Terming oil a "favored instrument for the social architect," Pogue challenged the notion that economic nationalism could ever successfully supplant free enterprise and pointed to the record of the United States and its high degree of industrial development as confirming his view. It has been proved, he declared, that oil can bring about a renaissance in the economic progress of a people and that it can also win wars.

With the United States and Venezuela producing 93 per cent of the Western Hemisphere's petroleum, the New World has taken the lead in production and consumption, producing 77 per cent and consuming 68 per cent of the world's oil, the speaker said. "Was this because of a paucity of oil reserves in the Eastern Hemisphere?" he asked. "The answer must be sought elsewhere, for the potential oil reserves of the Eastern Hemisphere are greater even than those of the Western."

Technology offers the greatest

scientific assurance of a continuing oil supply, as illustrated by our oil progress over that of every other nation. "The natural petroleum and other hydrocarbon resources of the United States are so vast that this country could be kept self-contained in oil for an indefinite period" should a policy of isolation ever be adopted. But as against a policy of isolation, he urged "the principle of an international division of labor" to promote oil developments of our neighbors "with resultant expansion in international trade."

There is being evolved in the United States, Pogue said, an "oil policy" which should prove of far reaching benefit. He referred to the recent recommendations of the foreign operations committee and the Petroleum Industry War Council. These recommendations, Pogue continued, made a strong case for free enterprise, opposed the Government's entry into the oil business, endorsed the conservation system in use here, favored the open-door policy and equality of opportunity in foreign oil operations, and urged the diplomatic support of American nationals to these ends.

Peru Makes Air Survey of Oil Areas

LIMA, Peru.—Aerial surveys of four unexplored petroliferous areas which are regarded as promising were made by the Peruvian Government in 1943. Tests made by two drilling rigs in the Pirin field, near Lake Titicaca, have afforded little encouragement thus far, according to reports. The Lake Titicaca area, which extends from Puno to the Ramis River, consists of an anticlinal structure interrupted by folds and faults in formations of schists, sandstone, limestone, and conglomerate, the faults permitting the escape of petroleum, gas, and water to the surface. After producing about 284,000 bbl. between 1906 and 1915, the Pirin wells were abandoned because of large water flow.

The most important oil activities in Peru are those on the northwest coast in the Department of Tumbes, where fields are being worked by two private companies and the Peruvian Government. Production figures are not yet available, but they will probably show these fields represent 60 per cent of Peru's annual output.

The only other important field is at Agua Caliente, of interest because of being in the Amazon Valley. Seven wells have been drilled there since 1937, and a small batch-type refinery with a capacity of 380 bbl. daily has replaced the home-made skimming plant. Storage and transportation facilities have prevented development of a market for this oil.

Production in the Agua Caliente field was reported to be 30,500 bbl. in the first 5 months of 1943, only a small increase over output in the corresponding period of 1942 but well above the 1941 figure of 13,750 bbl. The crude is paraffinic, with low sulfur content, unfit for production of high-octane gasoline without blending. Lack of storage has made it necessary to pump both gasoline and diesel fuel back into the wells. When transportation and storage difficulties have been overcome, it is highly probable that these fields can produce gasoline for the Amazon Valley in Brazil.

Though complete figures on oil production in the whole of Peru are not available, it is expected that 1943 will show an increase over the 13,628,459 bbl. produced in 1942. During the first 9 months of 1943, Peru production was 10,965,537 bbl., an increase of about 9 per cent over the corresponding period of 1942. Natural gasoline for the same period was 786,647 bbl., an increase of 5 per cent.

Because of the strategic location of the Peruvian fields, they have been extremely important in the petroleum program of the United Nations. Output for 1944 is expected to be at about the level of the 2 preceding years. Indications are that there will be increased demand for Peru's oil after the war.

Cut in Canada's Fuel Oil And Gasoline Likely

OTTAWA. — Further reduction of Canada's fuel-oil and gasoline supplies may be necessary, according to C. D. Howe, munitions minister. The situation regarding these commodities is getting no better, Howe warned. Careful planning and the vigilance of enforcement officers have provided a sufficiency and prevented abuse, he said, but should war consumption continue at the present level further curtailment would be unavoidable.

Naphtha Rationing Under Consideration of OPA

WASHINGTON. — Rising sales of naphtha, especially in the Middle West, may result in the rationing of that product by Office of Price Administration, which has such action under consideration. Problems peculiar to the distribution of naptha were discussed at a recent conference of OPA gasoline rationing officials and five naphtha specialists. Authorization from War Production Board would have to precede actual rationing of naphtha, but it is said Petroleum Administration for War will ask for such authorization. OPA's interest in the situation grows out of the use of naphtha in passenger cars and the consequent impairment of the gasoline-rationing program.

DEATHS

William Marsh Rice, Jr., 86, director of Navarro Oil Co., Reed Roller Bit Co., and Houston Land & Trust Co., died June 25 in Houston. He was chairman of the board of trustees of Rice Institute, graduate of Princeton University, and a member of Phi Beta Kappa.

F. Ryell Sheller, 55, Los Angeles, sales manager of Wilshire Oil Co., met death by drowning June 12 while fishing at Gregory Lake, near Crestline, Calif.

Hilmar Papst, 71, gas engineer and inventor, died in Portland, Ore., recently. He was active in the development of natural gas for heat and light in the eastern, middle-western and Pacific Coast areas.

Stafford Smith, 52, a senior counsel of Socony-Vacuum Oil Co. and of its predecessor, Standard Oil Co. of New York, since 1924, died June 21 in Hot Springs, Va., where he had gone 5 days earlier from his home in Larchmont, N. Y.

Adolph Schorman, 84, for more than a half-century an active producer in the Bradford and Allegany oil fields, died June 19 in Bradford, Pa., where he had resided since 1914. He owned oil properties in Duke Center and vicinity.

Karl E. Kneiss, 72, for years manager of the asphalt and road sales department of Tide Water Associated Oil Co., San Francisco, died June 13. He joined Tide Water in 1907 and long served as treasurer of The Asphalt Institute, Pacific Coast division.

Frank A. Perrine, 67, oil operator, died June 19 in Emlenton, Pa.

Chester L. Wildey, 52, Woodlawn, Ill., in the production department of Gulf Oil Corp. for 25 years, died June 17.

Willis F. Reightner, 70, of Emlenton, Pa., independent oil operator, died June 16.

Fred A. Graybill, 58, attorney for Mid-Continent Petroleum Corp., Tulsa, died June 23.

Tannin Solutizer Process Practically Automatic; Saves 6.5 Cents Per Barrel

by John P. O'Donnell

Addition of a small amount of tannin as oxidation catalyst improves the operations and results obtained from the solutizer method for removing mercaptan sulfur from gasolines. Lead susceptibility is increased and operating costs are reduced from the results with doctor sweetening or the earlier solutizer method. Savings of 6.43 cents per barrel in Socony-Vacuum's Providence, R. I., refinery make the method a paying proposition.

THE deleterious effect of sulfur on the octane value of gasoline is becoming an increasingly important problem for refiners. This is caused by the more widespread use of high-sulfur crudes. Since the presence of such compounds in motor fuel may result in a lower octane number of as much as two points, it is obvious that their removal is highly desirable when it can be effected economically.

In the past most attention has been directed to the correction of the offensive odor characteristics caused by the presence of mercaptans. For years gasoline has been doctor sweetened to remove this odor. In doctor sweetening it is corrected by converting the mercaptans to other sulfur compounds by oxidation. While this step removed the odor, the harmful effect on the octane value of the gasoline was not affected appreciably since the injurious sulfur compounds remained.

Some time ago it was found that the removal of lower-molecular-weight mercaptans could be effected by caustic washing the gasoline and then steam stripping the caustic soda. The low solubility of the higher-molecular-weight mercaptans in caustic-soda solution made their removal by this method impossible. This was overcome by the development of the solutizer process by which solubility promoters were added to the caustic. Use of these promoters made the removal of the heavier mercaptans possible and their removal improves the lead susceptibility of the gasoline.

Original Development Improved

The solutizer process was developed by Shell Development Co. An improvement, which has resulted in substantially lower costs, without impairing efficiency, has been developed by Socony-Vacuum Oil Co., Inc. This company has been operating a full-scale unit on a semiexperimental basis employing the less expensive process, at its East Providence, R. I., refinery for more than a year. Results have been so satisfactory that other installations, one of which will treat more than 40,000 bbl. of gasoline per day, are being installed. Because of the improvement in the quality of the product, the process is viewed more as an additional refining step than a mere treating function.

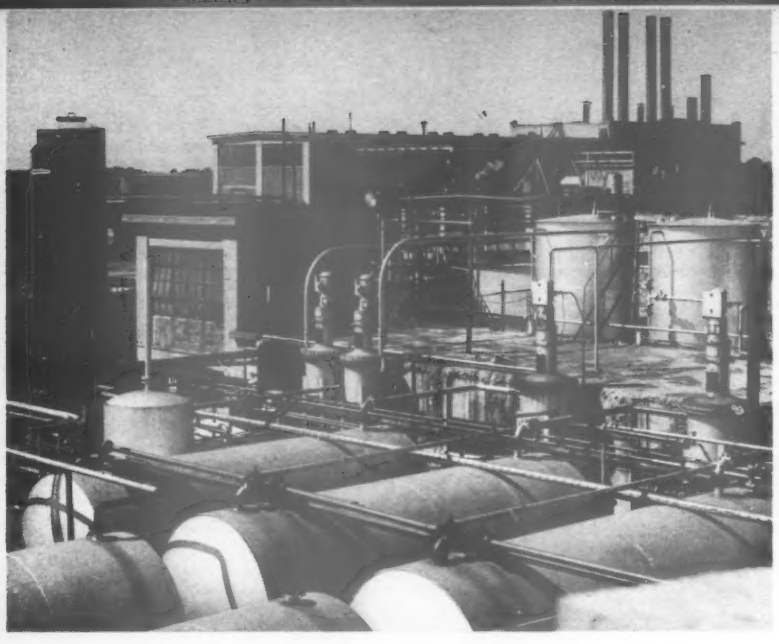
Through the addition of a small amount of caustic-soluble tannin it was found that oxidation regeneration could replace steam stripping of the treating solution. Tannin catalyzes the oxidation of the soluble mercaptans to insoluble disulfides with the aid of a small amount of air. The air-solution contact time is short and temperatures are moderate. By replacing steam stripping with oxidation regeneration (a) the amount of equipment necessary is reduced, (b) lower temperatures are employed thus reducing deterioration of equipment, and (c) steam requirements, one of the most expensive features of the steam stripping method, are virtually eliminated.

Mercaptan—	Raw gasoline		Treated gasoline	
	Weight, %	% of total	Weight, %	% of total
Methyl	0.0165	25.4	.....	....
Ethyl	0.0147	22.7	0.0001	5.0
Propyl	0.0131	20.1	0.0003	15.0
Butyl	0.0068	10.4	0.0005	25.0
Amyl	0.0050	7.7	0.0004	35.0
Hexyl, heavier	0.0089	13.7	0.0004	20.0
Total	0.0650	100.0	0.0020	100.0

The individual chiefly responsible for the improvement in the solutizer process described herewith is S. P. Cauley of the technical service division of the Socony-Vacuum Oil Co. general laboratories at Brooklyn, N. Y. Cauley, who graduated from Rose Polytechnic Institute in 1934, has been with Socony-Vacuum since 1936 after 2 years with Anaconda Copper Co. He served in various refinery departments and the laboratory at East Chicago until his transfer to the general laboratories in 1939.

The accompanying analysis of mercaptan distribution of the raw and treated gasolines shows the ability of the tannin solutizer process to reduce the content of both light and low-molecular-weight mercaptans to negligible proportions.

An effluent mercaptan content of 0.001 to 0.002 per cent by weight may be obtained on most gasolines with three-stage contacting. This is not sufficient to meet doctor sweet specifications. However, it is generally accepted that these specifications are impractically severe, that an amply odor-free product is obtained with a mercaptan content in the above-mentioned range and that sufficient treating to meet outmoded doctor tests is



Overhead view of tannin solutizer plant showing the turbo mixers and settling tanks of the various stages

unnecessarily expensive. There are a number of companies marketing gasolines today which will not meet such tests but which have not suffered any loss of public acceptance as a result.

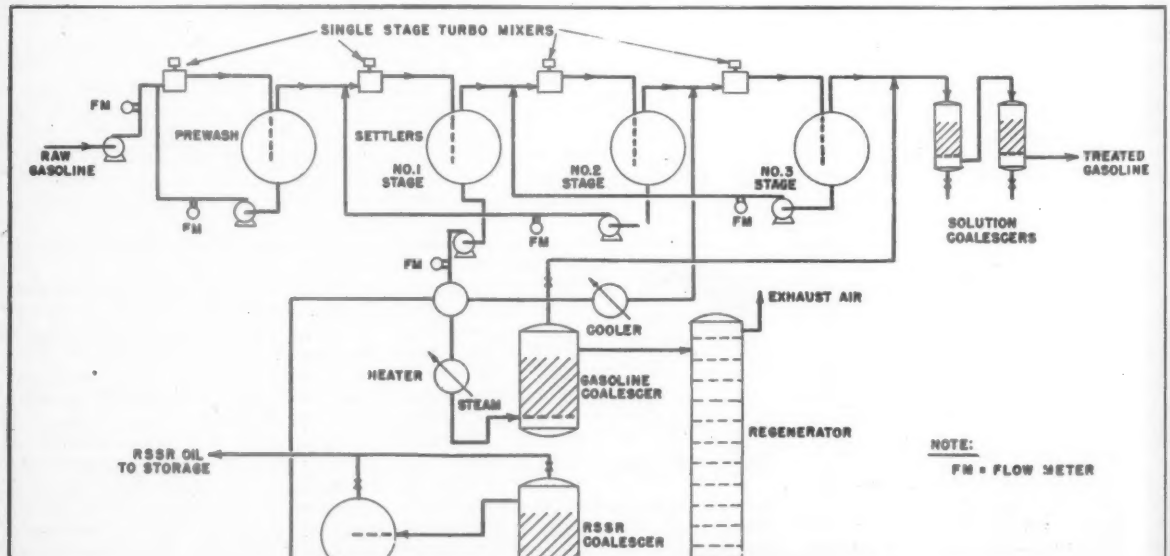
A flow diagram of the new process as it is employed at the Socony-Vacuum refinery is shown in Fig. 1. The principal pieces of equipment are four single-stage turbo mixers, the prewash and three settling tanks, two solution coalescers, heat exchanger, a gasoline coalescer, a regenerator, a coalescer for the removal of sulfides, a lean solution settler, cooler and flow meters. Prior to this installation the East Providence refinery was equipped with a very modern type doctor-treating unit and practically all of the equipment used in the solutizer plant was adapted from the displaced unit. Remaining equipment was obtained elsewhere in the refinery.

Raw gasoline is prewashed with a 20 per cent caustic soda solution to remove the hydrogen sulfide and a portion of the alkyl phenols. The solution stream joins the gasoline stream ahead of the turbo mixer which discharges the mixture into a settling tank. Separated solution is recycled to the gasoline stream and the caustic-washed gasoline passes to the series of mixers and settlers in which it contacts with the solution for the extraction of the mercaptans.

The latter is a countercurrent three-stage operation. In the first stage the gasoline contacts twice-used solution from the second, in the second it contacts once-used solution from the first and in the third it contacts fresh solution. In each stage the solution and gasoline are joined and mixed in single-stage turbo mixers before entering the tanks from which the solution is removed at the bottom and the gasoline from the top. Gasoline from the third stage is run through two coalescers, packed with steel wool, to remove entrained solution.

The fat solution from the first stage is pumped through a heat exchanger and heater, where the temperature is raised to 130° F. and a steel-wool-packed coalescer. Gasoline removed at this point joins the treated-gasoline stream from the third stage. The solution from the coalescer then enters the regenerator where air is bubbled up through it to convert some of the mercaptides to disulfides. The disulfides are removed in the final steel-wool coalescer and the regenerated solution passes to a combination settler and storage tank in which the remainder of the disulfides are removed.

As is apparent from this description, the operation is almost entirely automatic and a minimum of labor is required. One operator per shift is all that is necessary at the East Providence plant. While this is a small unit, capable of processing 3,500 bbl. per day of gasoline, the labor requirements of a larger unit would be the



Flow diagram of tannin solutizer treating system, East Providence Works, Socony-Vacuum Oil Co., Inc.

same. The principal controls are the acid-oil content of the prewash solution and the volume of air used in regeneration. The prewash solution is changed when the acid-oil content reaches 28 per cent. The volume of air controls the degree of regeneration.

The solution is composed of 4.6 N NaOH — 0.9 N Na AK — 1 per cent tannin. The alkyl phenolate content is maintained at approximately constant concentration by the prewash. Most of the treating solution in the Socony-Vacuum unit has been in use for 2 years. Before being introduced into this system it was used for 7 months in a caustic scrubbing-steam regeneration system. The new unit was put in operation in December 1942, and since then no makeup has been added and an analysis of the solution after a year's use revealed little change. Comparative analyses at the time of starting up and a year later are given below:

	Date of analyses	
	12-25-42	12-31-43
Total alkalinity, N	6.50	5.90
Alkyl phenolate, N	0.86	0.90
Free Na OH, N	5.30	4.60
Viscosity*	5.34	5.20
Carbonates, %	0.32	0.57

*At 100° F., centistokes.

The principal criteria for evaluating a new process are the results obtained and the costs involved in comparison with those of process which it replaced. The doctor-treating unit which the tannin-solutizer plane replaced at the Socony-Vacuum refinery was a well-designed, constructed and operated unit so that its results were probably as good as could be attained in this type of operation. The octane drop on the gasoline, which contained 0.060 per cent mercaptan sulfur, was 0.5. In the tannin solutizer operation the octane number of the gasoline (clear) was unchanged and the lead susceptibility was increased. A comparison of the octane numbers (MM) of raw (mercaptan sulfur, 0.064 per cent) and treated gasolines follows:

	Raw	Treated
Clear	63.8	63.8
Plus 1 cc TEL	69.2	70.6
Plus 3 cc TEL	74.0	75.6

A summary of operating costs also emphasizes the superiority of the tannin-solutizer process. The advantage gained in the reduction of these costs is supplemented by a reduction of 50 per cent in inhibitor costs, by substantially lower maintenance costs resulting from the absence of wear and corrosion, by a 66⅔ per cent decrease in labor costs, and by the negligible loss of oil. If it is assumed that all the oil entrained or dissolved in solution is lost, it would amount to 0.015 to 0.020 per cent of the charge. Actually very little oil is removed by the air stream and since the oil content of the recycled solution remains virtually constant, the oil loss is almost imperceptible.

A comparison of the operating costs of the two processes follows (dollars per barrel):

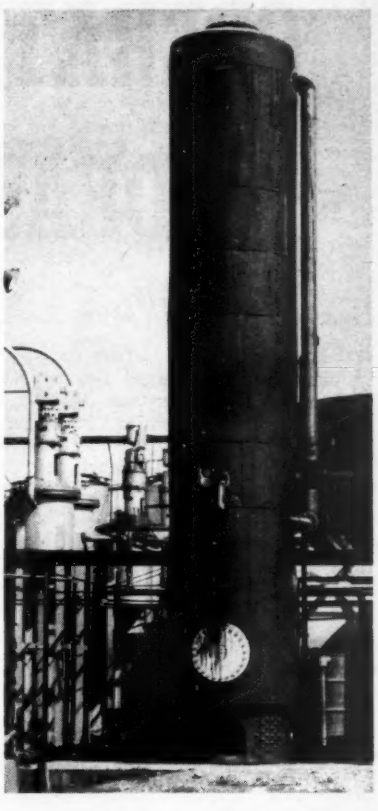
	Doctor	Tannin solutizer
Direct operating costs:		
Power at $0.01/kw.*)	—0.0015	—0.0015†
Caustic soda	—0.0048	—0.0016‡
Litharge, sulfur	—0.0018	.....
Steam at $0.25/M. lb.*	—0.0028	—0.0005
Tannin	.....	—0.0003
Total	—0.0109	—0.0039
Indirect operating costs:		
TEL credit at 72 ON (MM)	.....	+0.0407
TEL debit at 72 ON (MM)	—0.0166	.....
Total	—0.0275	+0.0368
Comparable savings	.....	+0.0643

*Assumed. †Includes air compression cost. ‡Includes prewash solution cost.

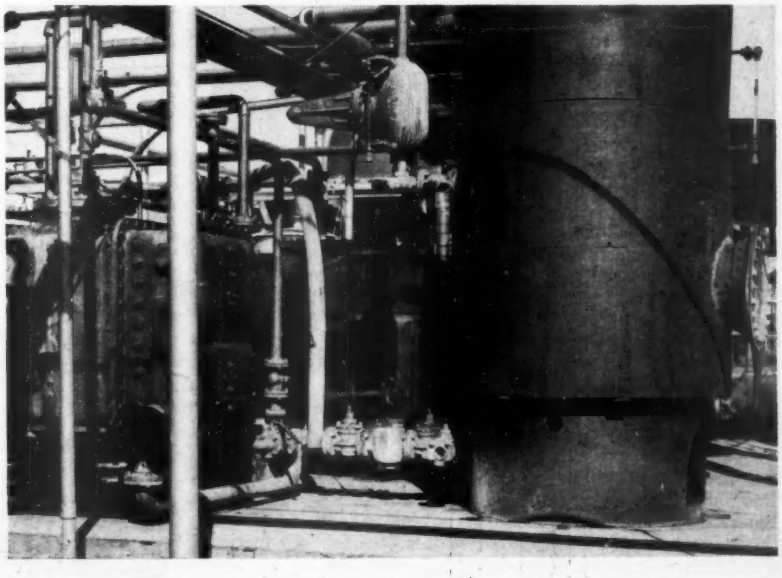
The most significant feature of this comparison is that the doctor-treating method, including the detrimental effect on lead susceptibility, costs 2.75 cents per barrel whereas the tannin-solutizer process, taking into consideration the improvement in lead susceptibility, results in a return of 3.68 cents per barrel. The value of the improved lead response of the latter much more than offsets the direct operating costs. By converting an operation involving expense to one producing income, the net advantage amounts to 6.43 cents per barrel.

Of additional significance currently is the fact that, at today's reduced octane levels, gasoline produced at the small East Providence refinery can now be marketed as premium grade instead of regular. It would also be possible to effect slightly greater savings than those indicated above by the use of exhaust steam which would be entirely practicable in view of the low temperatures (130° F.) and low pressure (10 p.s.i.g.) involved.

The ability of the solutizer process, as developed by Shell Development Co. to extract mercaptans and remove detrimental sulfur and its present economy, resulting from Socony-Vacuum's discovery and application of the catalytic activity of tannin, make the tannin-solutizer process an efficient and highly economical method for the treatment of gasoline.



Regeneration column on tannin solutizer unit in which air contacts the fat solution



Close-up showing heat exchangers and base of regeneration column

OPERATING IDEAS

Heavy-Duty Steel Mud Testing Cabinet

THE accompanying picture shows a compact and easily portable combination bench and cabinet for mud-testing vessels and instruments in use on a large, deep-drilling rig now operating in Mississippi. It is built of discarded pipe for legs and heavy steel plate material for enclosures and the bench top. It is of welded con-

struction and the cabinet space provides substantial protection for vessels and instruments during moves. A water-line connection is installed through one of the legs. Handles are provided on top for picking up with a winch-line hook for hoisting on trucks, and on the side for manual lifting and moving.

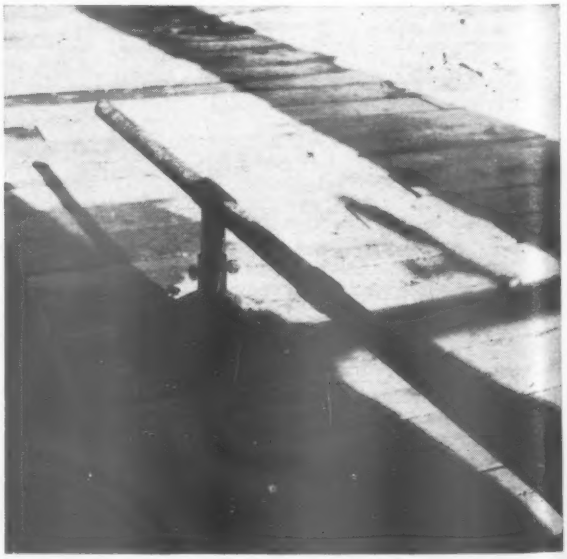
Lifting Tool for Drill Pipe Stand

IT often is desired to move the bottom of a stand of drill pipe a little closer to the remainder of the pipe stacked in the derrick or to some different position. Such occasions arise when it is inconvenient to pick the stand up again with the elevators. A simple tool (shown in the accompanying picture) for doing this was devised by the crew on a rig in the Heidelberg field, Mississippi. It was

made of a section of iron bar. One end to be used for lifting was split the required length and the resulting two prongs were bent outward and shaped to fit around the tool-joint pin just below shoulder. The handle end was shaped for working convenience and to provide leverage. A large bolt fitted in and welded on the under side of the lifting and at the point where the bar was split serves as a leg and lifting and turning pivot.

Anchor for Blowoff Line

BLOWOFF lines from boilers must have some type of light anchorage to prevent their being moved due to the force of the expanding steam coming out of the end. One operator has designed an anchor which is adjustable and which supports the line and at the same time permits the line to expand and contract. The support and anchor is made of a square of tank plate, in the center of which is welded a 2-in. nipple braced by four gussets. A 1½-in. nipple topped with a 2½-in. collar to form a tee slips inside the 2-in. nipple in the base. Holes through the 2-in. and the 1½-in. nipples permit adjustment of the height of the anchor. Small holes through the brace allow it to be nailed to the plank matting or to the cribbing.



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PRACTICAL REFINERY ENGINEERING

3—Practical Heat Transfer Calculations

by Paul Buthod and B. W. Whiteley†*

The first and second articles in this series were published in the two preceding issues. This, the third of the series of articles concerning graphical methods for the determination of various factors used in heat-transfer calculations, presents a method for determining mass velocities directly from a chart. Four practical examples concerning the use of the chart are given.

IN many respects, heat transmission is analogous to the flow of electricity. The quantity of electricity passing through a circuit in a given period is dependent on the electromotive force and the resistance of the system. The fundamental equation of heat transfer:

$$q = U A \Delta t \quad (1)$$

where "q" expresses the rate of heat flow; "U," the conductance of the material per unit area; "A," the area of contact; and Δt, the driving force which causes the flow of heat. The reciprocal of the conductance is the thermal resistance. In any type of heat-exchange apparatus, the heat encounters several resistances in series, and since these resistances are additive, Equation 1 becomes:

$$q = \frac{A \Delta t}{R_1 + R_2 + R_3 \ldots} \quad (2)$$

It is again apparent that Equation 2 is analagous to the flow of electric current through several resistances in series.

The simplest case of heat transmission from a hot fluid through a metal wall to a colder fluid is shown in Fig. 1. If the two fluids are being circulated, heat transmission within the body or core of the hot fluid occurs chiefly by convection. Next to the metal wall, however, the heat encounters a stagnant film of fluid, through which it must flow by conduction. The temperature gradient for these paths is noted in the figure. As the heat passes through the stagnant fluid film it encounters a further resistance (usually of minor significance) in the metal wall. The flow of heat is further restricted by the stagnant film and core resistance on the cold fluid side.

In simple terms, heat-transfer calculations consist almost entirely of the computation of these thermal resistances and the true mean-temperature difference which causes the flow of heat.

The thermal resistances of the stagnant film and fluid core on one side of the metal wall are grouped together for practical purposes and calculated as one resistance. This thermal resistance offered by the fluid is dependent on such fluid properties as velocity, density, viscosity, specific heat, and thermal conductivity as well as the cross-sectional area of fluid flow.

*University of Tulsa. †Gulf Oil Corp.

Units Used in Heat-Transfer Calculations

The evaluation of these physical properties of the fluid in heat-transfer calculations is often confusing due to the fact that the rate of fluid flow may be given in barrels per hour or gallons per minute whereas the formulas for computing film resistances require linear velocities in feet-second units. Viscosities, specific heats and thermal conductivities as obtained from handbooks may be tabulated in metric units and as a net result, a wholesale process of conversion is necessary in order to obtain an answer.

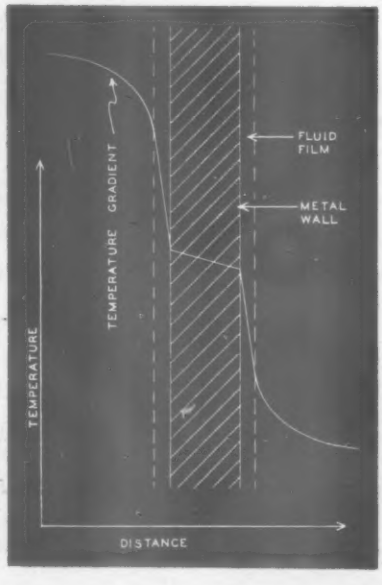


Fig. 1: Temperature gradients

Any pressure or temperature changes may cause the linear velocity and density of the fluid to vary throughout the length of the apparatus. This difficulty in calculation is obviated by use of a mass-velocity term which is the product of velocity and fluid density. The units of mass velocity are pounds per hour per square foot and this term remains constant throughout the length of the exchanger. The use of mass velocity in calculations is particularly convenient in the case of gases which are being heated or cooled.

Where the flow rate is given in barrels per day, gallons per hour, 1,000 cu. ft. per day, or pounds per hour units, the mass velocity can be determined directly from Fig. 2. The use of this chart is illustrated by the following examples:

Example 1.—20,000 lb. per hour of a 28° A.P.I. crude oil are handled in a heat exchanger through an annular space with a cross-sectional area of 1.0 sq. in. Calculate the mass velocity "V."

Solution.—The cross-sectional area is first converted into an equivalent-diameter pipe. Enter the top of the chart on scale "A" at 1.0 sq. in. cross-sectional area, and follow the dotted guide line to the horizontal "Area Reference Scale." The intersection shows an equivalent diameter of approximately 1.13 in., which is obtained by interpolating between the solid diagonal lines marker "Actual ID."

The next step is to combine the rate of flow with the equivalent diameter just obtained. Enter the bottom of the chart at 20,000 lb. per hour and follow the solid guide line to the intersection of the 1.13-in. diameter diagonal. Follow the intersection, horizontally to the left and read V = 2,900,000 lb./hr.-sq. ft.

Example 2.—The flow rate of a 28° A.P.I. crude is 1,560 bbl. per day

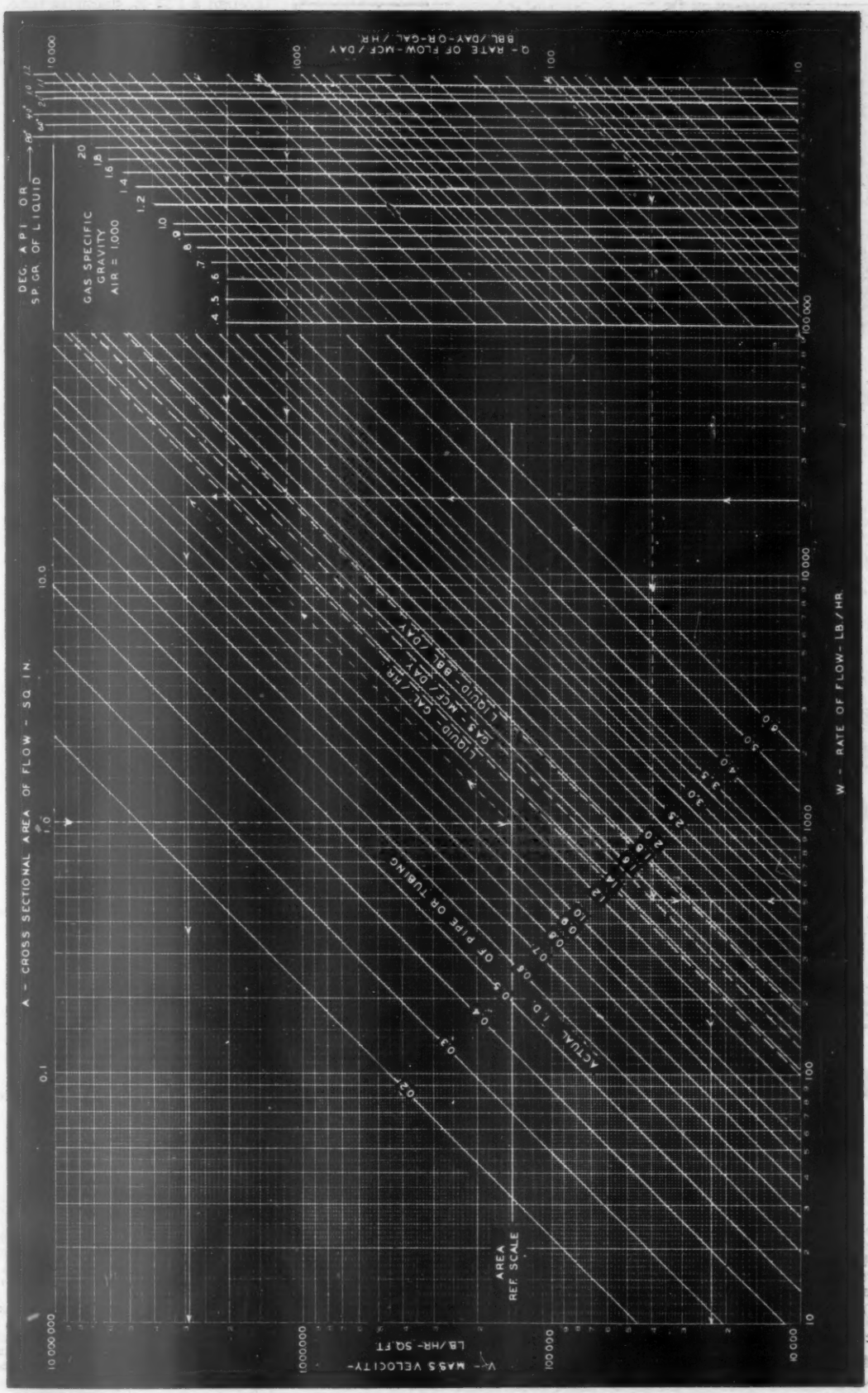
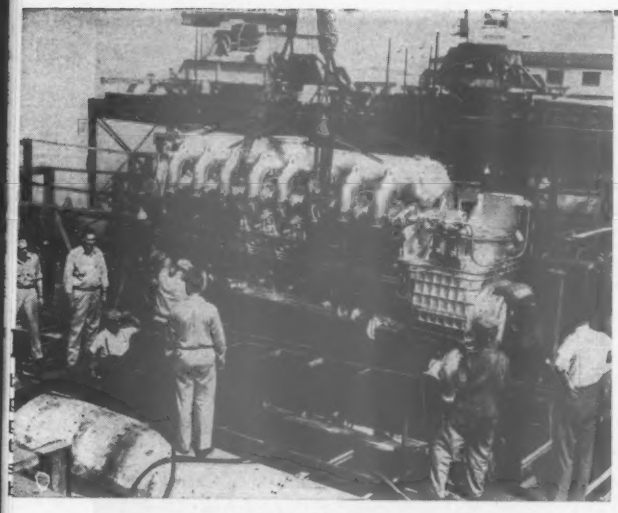

Q - RATE OF FLOW - MCF/DAY
BBL/DAY-OR-GAL/HR
DEG. API OR
SP. GR. OF LIQUID
GAS SPECIFIC
GRAVITY
AIR = 1.000
A - CROSS SECTIONAL AREA OF FLOW - SQ. IN.
W - RATE OF FLOW - LB./HR.
V - MASS VELOCITY - LB/HR - SQ.FT
AREA
REF. SCALE
ACTUAL I.D. OF PIPE OR TUBING
GAS - MCF/DAY
LIQUID - BBL/DAY
LIQUID - GAL/HR

Fig. 3



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through a 1.13-in. diameter tube. Calculate the mass velocity "V."

Solution.—Enter the chart at the right at 1,560 bbl. per day and move downward parallel to the diagonal guide lines until reaching a position between the vertical lines marked 20° A.P.I. and 40° A.P.I. and interpolate for the 28° A.P.I. line. From this point move horizontally until reaching the dotted line marked "Liquid—barrels per day." This intersection coincides with a rate of 20,000 lb. per hour. Rising vertically to the 1.13-in. tube-diameter line and then horizontally to the left, gives V = 2,900,000 lb./hr.-sq. ft.

Example 3.—The rate of flow is given as 2,740 gal. per hour, and other conditions are to be the same as in Example 2. Calculate the mass velocity.

Solution.—This example is solved in the same manner as Example 2 except that the (Liquid—gallons per hour) line is used instead of the "Liquid—barrels per day" line.

Example 4.—105,000 cu. ft. per day of a gas (measured at 60° F. and 760-mm. pressure) passes through a 2-in. i.d. pipe. Calculate the mass velocity "V." Gas specific gravity = 1.5.

Solution.—Enter chart at the right at 105 M.c.f. per day and move downward parallel to the diagonal guide lines to a point between the vertical line marked 1.4 and 1.6. The 1.5 sp. gr. line is obtained by interpolation. Move horizontally to the left to the diagonal dotted line marked "Gas—M.c.f. per day." This intersection shows 500 lb. per hour handled. Drop vertically to the intersection with a diameter of 2.0 in. and then move horizontally to the left and read V = 23,000 lb./hr.-sq. ft.

BOOKS

PETROLEUM AND AMERICAN FOREIGN POLICY. By Herbert Feis. Published by the Food Research Institute, Stanford University, California. 62 pp. $0.50.

The author undertakes, in summary fashion, to review the whole petroleum situation and to outline a general policy into which Middle East petroleum policy would fit. Briefly, he suggests that vigorous measures be taken to assure fullest knowledge and best use of domestic natural petroleum reserves; that these reserves be safeguarded against further diminution by development of foreign oil reserves; that the American Government, while encouraging and aiding private oil enterprise in its task of foreign oil development, exercise a measure of guidance over the policies and certain of the activities of the oil companies; Middle Eastern oil resources should be more fully developed to meet the demands of the near future; the American Government should follow and sponsor a policy of "free and equal access" on the part of all peacefully acting countries, to oil supplies wherever produced. In the event these measures do not assure sufficient supplies for the armed forces, they should be supplemented by measures designed to serve this particular purpose, such as maintenance of storage, or acquisition directly by the Government of proven reserves that could be quickly developed.

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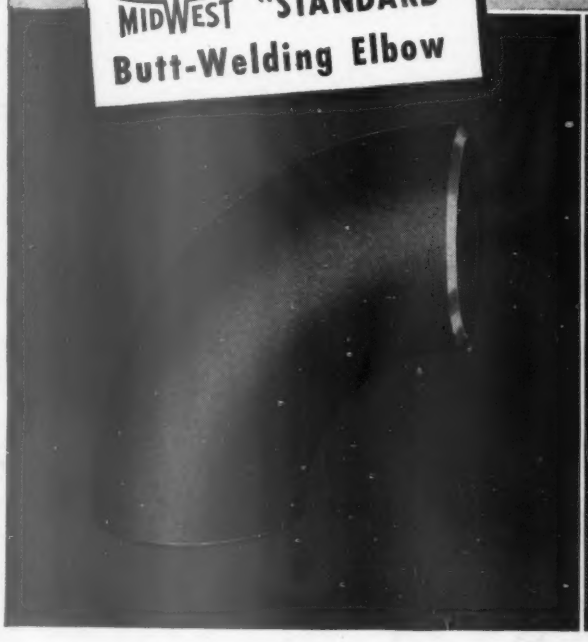

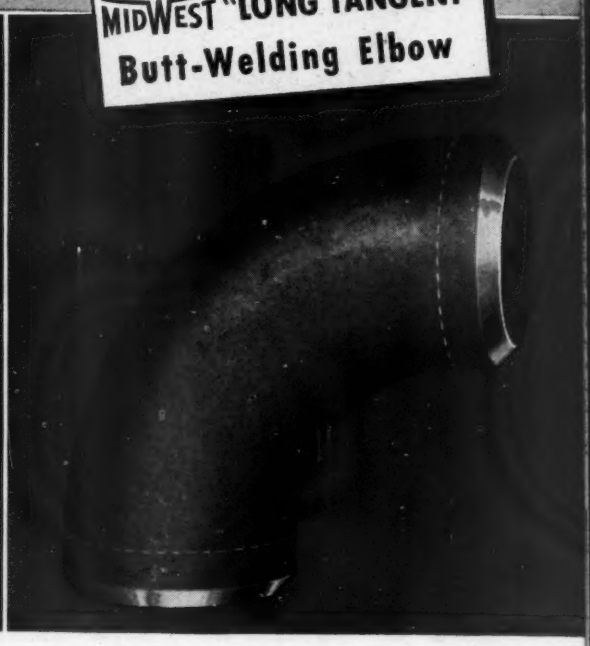

The difference between the two types of welding elbows shown above is in their dimensions. The "American Standard" elbow has a center-to-end dimension equal to one and one-half times the nominal pipe size. The Midwest "Long Tangent" elbow has tangents (straight ends) equal to one-fourth of the nominal pipe size; the center-to-end dimension is one and three quarters times the nominal pipe size. Important among the advantages of the long tangents are: (1) pipe and fitting more quickly and accurately lined up, (2) weld removed from point of maximum bending stress, (3) less pipe required, (4) short nipple and extra circumferential weld frequently eliminated, (5) slip-on welding flanges easily used, etc. There is no increase in price for Midwest "Long Tangent" Welding Elbows.

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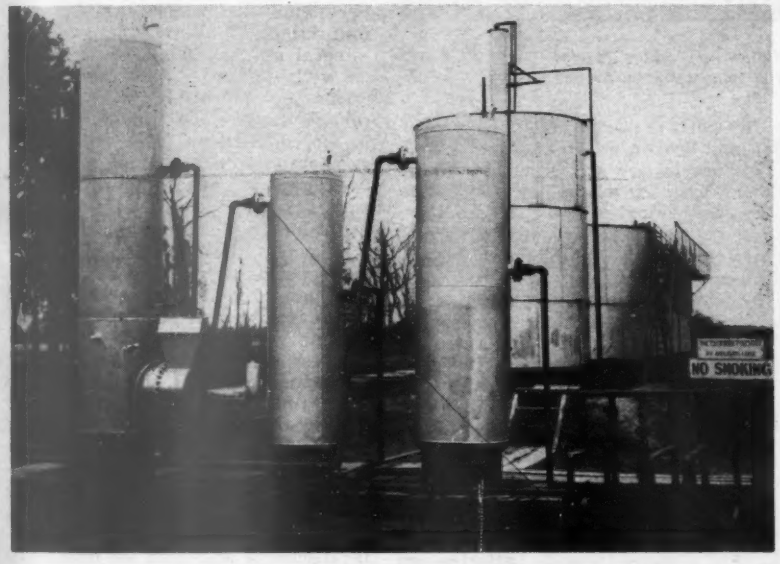
Savings Effected by "Rolling" Tanks With Heated Oil to Clean Bottoms

by Neil Williams

Practices inaugurated by California Co. in the Lake St. John field, Concordia Parish, Louisiana, are overcoming problems associated with treating and handling production from the Wilcox sands. The oil is exceptionally hard to treat due to troublesome paraffin conditions. Continuous reprocessing of viscous emulsions which collect in bottoms of stock tanks is making possible increased oil runs.

EARLY production operations in the Lake St. John field, Concordia Parish, Louisiana, resulted in excessive accumulations of heavy, viscous paraffinic emulsions in the bottoms of lease stock tanks. All tanks had to be entered frequently and manually cleaned. This represented a substantial cost item. Also, a sizable loss was incurred by having to discard the heavy bottoms as a waste product.

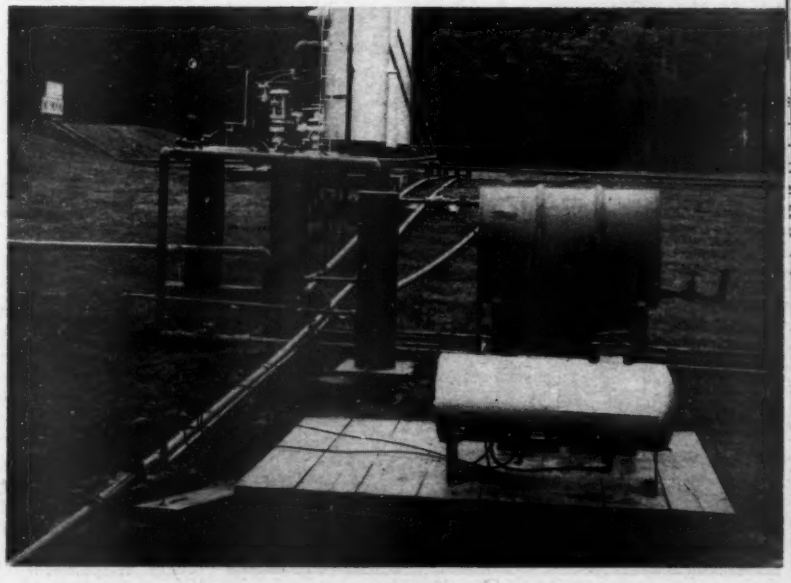


Above: Centralized separator and tank battery in the Lake St. John field. At left is specially designed testing separator with three-way valve control in small housing at side of lower compartment

The oil, produced from the Wilcox sands, is exceptionally hard to treat. It not only carries considerable paraffin, but this in combination with any water and b.s. forms a mixture that is not readily broken and settled out in the gun barrel, and quite a bit is carried over to be deposited in the stock tanks. So far this does not apply to the production recently opened in the deeper Tuscaloosa sands.

Practices followed by California Co., principal operator in the field, have been highly effective in overcoming this condition. Initial treatment of the oil requires both the application of heat and use of chemicals. The oil stream to the gun barrel is heated by circulation through a commercial gas-fired heater. Chemicals are injected into the stream by means of a small gas-operated feed pump installed on the line ahead of the gun barrel. The injector is a new type operated by means of a diaphragm control.

The problem of excessive accumulations of tank bottoms has been overcome by a practice of "rolling" the tanks with the heated oil from the gun barrel. Each tank battery is equipped with circulating lines connecting each tank in the battery with the gun barrel. Each tank in turn after being run to pipe lines and emptied is opened to system and the



Below: Treating chemical injector on crude line to separators. Behind it is drum containing chemicals being fed to injector. At left of drum is gas accumulator for operation of injector

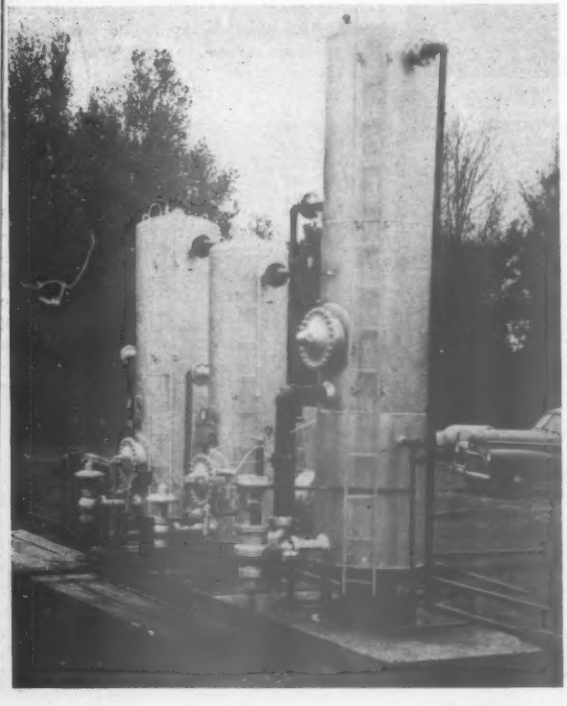
Oil circulating pump installation for "rolling" tanks. Designed for steam power it is being operated by gas

gun-barrel oil is cycled through it.

In this operation, the hot oil serves to dissolve the paraffinic bottoms from each tank run and return it in solution to the gun barrel for reprocessing. As a result the tanks are kept clean continuously. In over a year's time since the practice was inaugurated there has been no indication of any accumulation of tank botoms, and the necessity of frequent manua' cleaning of the tanks has been eliminated.

By reprocessing through the gun barrel, the tank bottoms collected after each tank run are further treated and broken down, and appreciable volumes of the paraffinic oil which formerly had to be discarded with the waste water and b.s. emulsion are retained in the system, materially increasing pipe line-oil recoveries.

Circulation of the oil is by means of a small reciprocating pump. It is of a type designed to be driven by steam but now is being operated by gas supplied from the field fuel system. Taking suction from the gun barrel, it cycles the heated oil to any of the tanks desired and back to the gun barrel, or from the gun barrel through the heater and back.



Back side of new testing separator (right) showing dump line connection from upper separator section to lower compartment. At bottom is valve control and meter installation for discharge from dump compartment

Separator and tank batteries on the various leases are centralized. Several of these are dual installations for handling the two different grades of oil produced from the Wilcox sands. Each single installation includes three separators, one for regular production from wells making clean oil; another for wells making water, and the third for testing purposes. Each also has its own gun barrel and three or four 500-bbl. stock tanks, the number depending on the volume of production to be handled by the lease. The production separators are manifolded so that the production from any or all wells can be run to either, and discharge either to the gun barrel or direct to tanks, depending on the production. A separate system is provided for the test separator so that any well can be tested at any time independently of the others.

Testing Separators of New Type

The testing separators are of a new type designed to insure the greatest possible accuracy in the measurement of fluid and gas production. They contain two sections, an upper separator unit, consisting of a conventional separator, and a lower auxiliary compartment, into which the separator unit dumps. The two sections form an integral unit. Production of the well or wells to be tested is run to the upper separator unit, where separation of the gas and fluid takes place in the conventional manner with the gas being vented and metered to the field gas system. Dumping of fluid is regulated by a three-way valve control. The lower compartment, into which the fluid from the upper separator section is dumped before metering, holds an even barrel which insures that no more than that volume will be passed at a time regardless of conditions in the separator and that, as a result, the fluid will be more uniform in its components to facilitate more accurate metering. The three-way valve functions to close the dump outlet from the separator section and open the discharge line from the lower dump compartment when the latter is full, and to close the latter discharge and open the dump outlet from the separator when the lower compartment is empty. Metering of the fluid is on the discharge from the dump compartment to the gun barrel or tanks.

Wilcox production in this field is obtained from five distinct sands ranging in depth from 3,400 to 4,500 ft. Crude from the upper sands has a fairly high octane and commands a premium over oil produced from the other sands. Gravity is approximately 33°. Crude from the latter sands has a substantially higher gravity (about 44°) but the octane is low. Tuscaloosa production, recently opened, is found at a depth of 9,100 ft. downstructure from the Wilcox area. Separate provision is being made for handling it. Only one well has been completed in it to date.

Dr. Harold W. Scott, head of the geology department of University of Illinois, will do some special work this summer in the Rocky Mountain region for Pure Oil Co.

Application of Directional Drilling to Find Lost Hole in West Moore Well

A number of unique practices hav been employed in drilling of th recently opened West Moore fiel Cleveland County, where an activ development program now is unde way. Some of these practices ar described in this article. Particula ly interesting are those involvin the whipstocking operations carrie on in drilling the discovery well

by Paul Reed

Above: As a result of wetting the kelly joint with steam condensate the kelly may be lowered more steadily. Right: Platform for derrickman built out toward center of derrick space to facilitate handling of stands of drill pipe.

IN the drilling of the active West Moore pool several unique practices have been applied of which the most unusual are probably the whipstocking operations for finding the hole of Mid-Continent Petroleum Corp.'s discovery well, 1 Edgar Harris, NE SE SW 29-10n-3w, Cleveland County, Oklahoma, contracted by Loffland Brothers.

Rarely do situations occur such as this one. In nearly half the cases of this kind in the last 10 years it is reported that the old hole was not found, in spite of considerable expenditures of time and money. At 1 Edgar Harris, where four whipstocks were set in operations which lasted 16 days, there were times when it seemed doubtful whether the old hole ever would be found. If it had not been found the investment in this important 8,792-ft. outpost well would have been lost.

When the well was started, 831 ft. of 13-in., 36-lb. slip-joint casing was set with 1,000 sacks of cement from top to bottom. From there on to a depth of 8,792 ft. the well was drilled satisfactorily without a protection string. After penetrating the top of the Wilcox sand at 8,780 ft., two 6-ft. cores were taken and a drill-stem test was run which indicated that bottom-hole pressure was 4,200 lb. In order to make adequate provision for anchoring connections to withstand high pressures, a decision was reached to run a 1,218-ft. string of 9⅝-in., 40-lb. casing to serve as a second surface string. This was cemented with 600 sacks of cement which circulated around the 9⅝-in. pipe. It had been observed before this was done that the hole had given no evidence of taking mud.

In drilling the plug it was found that cement had gone down the hole to form a long plug whose length could not be determined. It seemed that this condition resulted from the effect of a thief sand in the red beds.

Contact of the cement with the drilling equipment sidetracked the bit so that it was deflected to drill in the adjacent formation which was penetrated to 1,516 ft. The true situation was not apparent from early observations because the angle of drift was approximately the same in the new hole as that recorded during drilling of the old hole. In most cases of this kind there is a marked difference between the drift of the new and the old holes.

At this point Eastman Oil Well Survey Co. was engaged to furnish service and equipment for directing drilling to find the old hole. Eastman's first step was to make a "multiple-shot" survey of the hole from 1,516 ft. back to 1,220 ft. at 15-ft. intervals with an instrument for continuously photographing on 16-mm. film at 1½-minute intervals the readings of a watch, a compass and a plumb bob in order to determine direction and

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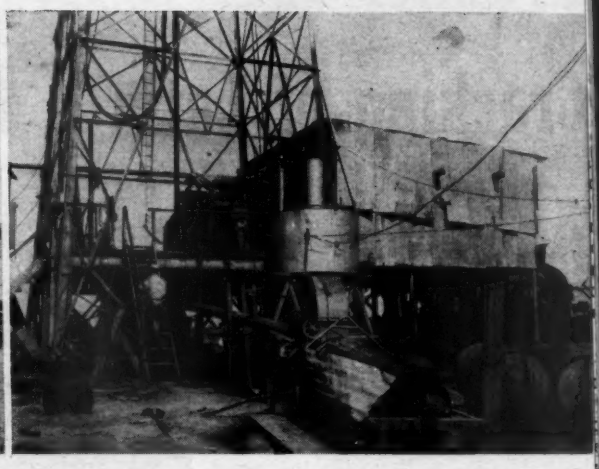

Left: Scrubber serving to remove pipe scale from natural gas transmitted to mechanical rig for fuel. Right: Rig with shale-shaker equipment of the Big Chief Drilling Co. drilling 1 Westermeier in the West Moore pool for Mid-Continent Petroleum Corp.

angle of drift at successive locations in the hole. A watch on the surface used in recording operations is synchronized with the watch in the instrument in the hole.

Subsequent operations for finding the old hole indicated that the new hole had forked from the old one and that at no time was the new hole far from the old hole.

Following the Eastman multiple-shot survey, the new hole was reamed to bottom with two 8¾-in. bits and 80-ft. drill collars to give stiffness which might make it possible to break into old hole. There were no results.

The new hole was then drilled from 1,516 to 1,638 ft. where No. 1 whipstock was set due west, a direction which was eventually recognized to be away from the old hole. After it was found that there were no results from this operation, the whipstock was pulled, the new hole was reamed and drilled from 1,638 ft. to 1,668 ft. where a single-shot directional survey was made before setting No. 2 whipstock North, 70° East. Drilling was done off the whipstock to 1,717 ft. with no results. In drilling off the whipstock, weight on the bit was reduced to 1,000 lb. which is normal for such operations.

Milling Shoe Run

The new hole was then reamed and drilled 10 ft. farther from 1,717 to 1,727 ft. In doing this the angle was changed to 1° 50′ and this section of the hole was in the direction of North 65 East. Because of the possibility of the new hole being so close to the old hole at certain points that separating formation material might be broken through, a milling shoe was run into the new hole on 120 ft. of 7⅝-in. casing to give rigidity which it was hoped might aid in kicking off into the old hole. There were no results.

A decision was then reached to plug back so that a whipstock could be set in the vicinity of 1,500 ft. In order to insure having enough cement in the hole it was cemented back from 1,632 ft. to 1,370 ft. with 100 sacks of quick-set cement.

After drilling the cement plug to the desired depth of 1,485 ft., an effort was made to drill off the cement plug with a kickout joint in several directions on the chance of going into the old hole. There were no results.

Now that the operators were in a position to whipstock from locations nearer to the point where the new hole forked from the old hole chances for finding the old hole soon were much improved. It was not certain just where the two holes forked; at this depth the drift of the old hole was only ½°. No. 3 whipstock was set at a depth of 1,484 ft. directed due north and the hole was drilled at an angle changed to 1° 45′ with direction of North, 10 East, to 1,505 ft. with no results. After No. 4 whipstock was set at 1,509 ft., directed North, 55 East, the hole was drilled 40 ft. to 1,545 ft., where it was clear that the old hole had been finally reached. The drift of the old hole had been slightly in a southeasterly direction.

Drilling continued down the old hole to 1,561 ft. before the whipstock was pulled out and the hole was reamed with a 8¾-in. snubnosed pilot bit from 1,509 to 1,561 ft. Pipe was run to 2,084 ft. and pulled out. Operators ran in with drill string to the bottom at 8,792 ft. and well was drilled 8 ft. to total depth of 8,800 ft.

The mud in the old hole was found to be in perfect condition with weight 10.2 lb. and viscosity 66 seconds.

A string of 8,784 ft. of 5½-in. 17-lb. casing was set on top of the sand with 1,200 sacks of cement. The well has 8,714 ft. of 2-in. 4.7-lb. tubing with a 4¾-in. bit left on the bottom. A 13/64-in. Otis bottom-hole choke is installed in the tubing at a depth of 6,600 ft. The well was not allowed to clean itself out because of the danger to flanged connections at the surface and that of cutting out the choke. Installation of the bottom-hole choke brought the gas-oil ratio from 9,000 down to 2,000 cu. ft. per bbl. Gravity of the oil is 47.5° A.P.I.

The principal fishing job took 8 days at 8,250 ft. where drill pipe broke at two points 20 ft. apart.

The casing for 2 Edgar Harris, NE NE SW 29-10-3w, consists of 65 ft. of 15½-in., 1,934 ft. of 10¾-in. and 8,772 ft. of 7-in. set through the sand. The company has No. 80 grade pipe for long strings and J grade pipe for short strings.

In the drilling of Sunray Oil Co. 1 Hardin in NE SE NE 31-10-3w, by Mabee Oil & Gas Co., one of the drillers, J. J. Hood, has installed small-diameter piping to provide for jetting steam on the kelly joint just above the rotary table. As a result of wetting the kelly joint with condensed steam it is reported that the kelly is lowered through the rotary table more steadily and that there is less tendency for it to stick than when the surfaces are dry. Prior to the recent practice of jetting steam on the kelly, some experimenting had been done with flowing a stream of water instead of steam on the kelly. But there were objections to using water because of effect on the mud. Still the immediate mechanical results were satisfactory. In fact, the steam jet or spray is said to have been more effective in cold weather than in warm because the larger amount of condensation meant that the surfaces of the kelly were wetter.

Among the features of Loffland Brothers rigs in the West Moore pool is a practice of having the derrick man work on a narrow platform extending out into the space in the derrick rather than from the fourble boards generally used extending the length of the derrick. As a result he works closer to the drill pipe. These rigs were equipped with gas scrubbers which are easily portable. It is reported that they were originally fabricated by a company welder for service in sour-gas areas and have been effective in the West Moore pool for removing scale from gas transmitted for fuel for mechanical rigs.

Cracking of Latin American Crude Oils

*by Gustav Egloff**

2—WESTERN VENEZUELA

THE principal petroleum producing area in western Venezuela is the Lake Maracaibo Basin. In the peak year of 1941 the lake fields accounted for 141,993,848 bbl., or 62 per cent of the total Venezuelan production of 228,131,138 bbl.† Since 1941 all Venezuelan fields have had to reduce their activity owing to inadequate marine transportation and shortage of drilling equipment, but as the shipping situation improves, normal operations are being resumed.

The lake fields are the oldest producers, and of these the Lagunillas formations contribute about one-half of the total. In 1941 the yield of crude oil from the Lagunillas district was 70,136,192 bbl.† The oils are asphaltic in character and are high in sulfur and low in gasoline content.

Properties of a Lagunillas crude oil are shown in Table 1. The sulfur content of 2.37 per cent and the gasoline content of 7.5 per cent are to be noted.

TABLE 1—PROPERTIES OF LAGUNILLAS CRUDE OIL

Gravity, °A.P.I.	16.9
Specific gravity, 60° F.	0.9535
Sulfur, %	2.37
Cold test, °F.	Below 0
B. s. and w., %	0.4
100 ml. distillation:	
I.B.P., °F.	215
10%	445
50%	692
80%	Cracking
% at 400° F.	7.5
% Coke by weight	10.7

Cracking Lagunillas Crude

Cracking of the crude oil was conducted in several ways to produce 400° F. end point gasoline and different types of residues. In a single-coil pilot plant, operating conditions were adjusted to produce three types of residuum and coke. Transfer temperatures from 910° to 930° F. were employed, and a coil exit pressure of 200 lb. per sq. in. The first residuum was 12° A.P.I. gravity; the second conformed to No. 6 A.S.T.M. fuel-oil specifications; and the third was a liquid residuum made as heavy as possible without coking. Duplicate coking runs were made in the single-coil plant and a coking run was also made in a two-coil plant wherein a light recycle stock was subjected to more severe conditions of both temperature and pressure than a heavy recycle stock which was cracked with the entering crude. In the two-coil run, transfer temperatures of 900° and 950° F., and pressures of 200 and 400 lb. per sq. in. were maintained at the exit of the heavy and light oil coils respectively.

Table 2 shows the yields of products obtained in these runs, including gasoline, residuum, coke, and gas. Table 3 summarizes the principal properties of the gasolines from the different runs. The A.S.T.M. octane number of all untreated gasolines was at least 70, and the gasoline from the two-coil coking run had an octane number of 75, the highest obtained in any test. The residue from the first two runs had viscosities and flash points conforming to No. 6 A.S.T.M. fuel-oil specifications, but the heavy residuum from the third run had a viscosity considerably above the upper limit of 300 seconds Furol at 122° F. specified for No. 6 fuel oil.

The gasoline from the second run,

TABLE 2—CRACKING YIELDS

Type of operation	Single coil					Two coil
Residuum, °A.P.I.	11.4	10.2	0.5	Coke	Coke	Coke
Specific gravity	0.9902	0.9986	1.0719	....	....	....
Yields, volume per cent of charging stock:						
Gasoline	24.7	30.8	46.5	67.0	65.3	58.0
Residuum	75.0	68.0	46.2	None	None	None
Coke, gas and loss	0.3	1.2	6.6	33.0	33.0	42.0
Gas: Cu. ft./bbl. charging stock	120	201	448	785	612	670
Coke: Lb./bbl. charging stock	...	...	...	85.4	105	66

TABLE 3—PROPERTIES OF CRACKED PRODUCTS

Type of operation	Single coil					Two coil
Residuum, °A.P.I.	11.4	10.2	0.5	Coke	Coke	Coke
Untreated gasoline:						
Gravity, °A.P.I.	56.1	53.4	55.6	54.7	54.6	56.8
Specific gravity	0.7543	0.7653	0.7563	0.7599	0.7603	0.7515
Color °Saybolt	...	8	...	Yel.	...	...
Doctor test	...	Pos.	...	Pos.	...	...
Gum, Mg./100 ml. (copper dish)	...	39	...	52	...	...
Sulfur, % by weight	...	0.30	...	0.33	...	...
Vapor presseure, Reid, p.s.i.	...	11.8	...	...	...	...
Oxygen bomb stability, induction period, min.	...	115	...	45	...	...
Octane No. (A.S.T.M.)	72	72	71	71	70	75
Octane No. (Research)	80	80	79	...	78	82
100 ml. A.S.T.M. distillation:						
I.B.P., °F.	94	108	105	98	103	103
10%	159	162	163	154	160	154
50%	277	271	274	276	280	259
90%	371	363	364	389	364	368
E.P.	398	400	403	400	396	406
Residuum:						
Gravity, °A.P.I.	11.4	10.2	0.5	...	...	...
Specific gravity	0.9902	0.9986	1.0719	...	...	...
Flash (Cleveland) °F.	265	265	345	...	...	...
Fire (open cup) °F.	305	305	380	...	...	...
Flash (Pensky-Martens) °F.	170	170	335	...	...	...
Viscosity, Furol at 122° F., sec.	274	251	...	...	...	...
Cold test, °F.	35	30	105	...	...	...
Viscosity, Furol at 210° F., sec.	...	...	337	...	...	...
B. s. and w. % (centrifuge)	0.1	0.2	2.6	...	...	...
I.B.P., °F.	450	488	504	...	...	...
% at 572° F.	11.5	12.5	6.0	...	...	...
Coke:						
Moisture, % by weight	...	...	...	0.30	...	...
Volatile matter (dry)	...	...	...	14.16	...	...
Ash	...	...	...	0.58	...	...
Fixed carbon	...	...	...	84.96	...	...
Total	...	...	...	100.00	...	...

*Director of research, Universal Oil Products Co.

†O'Donnell, J. P., The Oil and Gas Journal, 40, 44, 34 (1942).

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TABLE 4—TREATMENT OF CRACKED GASOLINES

Type of cracking operation	Residuum				Coking
Treatment	Sulfuric acid		Gray process		Sulfuric acid
Acid, lb./ bbl.	4	7	...	4	7
Barrels/ton of clay	...	...	1,400	...	...
Sodium plumbite, % 16° B.	3.0	3.0	None	3.0	3.0
Treating losses:					
Acid solution loss, %	1.2	2.2	...	1.0	1.7
Polymerization loss, %	0.9	1.5	3.0	0.7	1.4
Distillation loss, %	1.4	1.4	..	1.3	1.2
Total loss, %	3.5	5.1	3.5	3.0	4.3
Yields, % by volume:					
Finished cracked gasoline: % raw gasoline	96.5	94.9	97.0	97.0	95.7
Raw gasoline, % cracking stock	30.8	30.8	30.8	67.0	67.0
Finished cracked gasoline, % cracking stock	29.7	29.7	29.8	65.0	64.1

TABLE 5—PROPERTIES OF TREATED CRACKED GASOLINES

Type of cracking operation	Residuum			Coking	
Type of treatment	4 lb. acid	7 lb. acid	Gray	4 lb. acid	7 lb. acid
Gravity, °A.P.I.	55.8	55.8	55.5	54.7	54.7
Specific gravity	0.7555	0.7555	0.7567	0.7599	0.7599
Color °Saybolt	22	28	29	23	30
Color stability*	16	22	25	19	26
Doctor test	Neg.	Neg.	Pos.	Neg.	Neg.
Copper strip, corrosion	Neg.	Neg.	Slight	Neg.	Neg.
Gum, Mg./100 ml. (copper dish):					
Without inhibitor	25	4	14	17	3
With inhibitor No. 1 (0.025%)	6	8	12	4	2
Sulfur, %	0.17	0.14	0.23	0.19	0.15
Oxygen bomb stability, induction period, min.:					
Without inhibitor	55	70	85	80	90
With inhibitor No. 1 (0.025%)	220	425	225	465	660
Octane No. (A.S.T.M.)	71	71	72	70	70
100 ml. A.S.T.M. distillation:					
I.B.P., °F.	110	110	120	110	112
10%	160	166	172	167	168
50%	267	268	268	273	274
90%	350	350	359	356	356
E.P.	388	388	398	392	394
% distilled over	98.0	98.0	96.0	98.0	98.0
% bottoms	1.0	1.0	1.0	1.0	1.0
% loss	1.0	1.0	3.0	1.0	1.0

*Equivalent to 2 hours noon June sunlight.

which produced a 10.2° A.P.I. gravity residuum, was treated by sulfuric acid and by the Gray process, and the gasoline from the single-coil coking run was treated with acid. Raw gasolines were agitated with the quantities of 93 per cent sulfuric acid indicated, neutralized with sodium hydroxide, and rerun with fire and steam, using maximum still temperatures of 350° F., after which they were sweetened with 3 per cent by volume of 16° B. sodium plumbite solution. The Gray treatment was conducted on a laboratory scale, and the yield of treated gasoline actually obtained was multiplied by a factor of 10 to approximate large scale commercial results. The principal factors in the treatment of the gasolines and the yield of products are shown in Table 4, and the properties of the treated cracked gasolines are shown in Table 5.

Marketable motor fuels were obtained from all the treatments. The best color and color stability were shown by the gasoline from the coking operation after treatment with 7 lb. per barrel of sulfuric acid. The copper dish gum and induction period values were all within standard requirements. Sulfur contents were notably lower in the acid treated than in the Gray treated gasolines. The A.S.T.M. octane number of all treated gasolines was 70 or higher.

The La Rosa district is a part of the so-called north field on the eastern shore of Lake Maracaibo. In 1941 this district yielded a total of 21,967,320 bbl. of crude oil, or 15.5 per cent of the lake fields' production of 141,993,848 bbl. The La Rosa and the other northern field crudes are asphaltic in character, and have relatively high sulfur contents and low percentages of gasoline. Properties of a La Rosa crude oil are shown in Table 6.

The whole crude, which contained only 15 per cent by volume of 400° F. end point gasoline, was cracked in three ways in Dubbs pilot plants, using recycle operation. Two runs were

TABLE 6—PROPERTIES OF LA ROSA CRUDE OIL

Gravity, °A.P.I.	23.3
Specific gravity	0.9141
Sulfur, %	1.70
Cold test, °F.	Below 0
B. s. and w., %	0.1
100 ml. distillation:	
I.B.P., °F.	166
10%	336
50%	684
90%	...
E.P.	725
Distilled at 400° F., %	15.0

TABLE 7—CRACKING YIELDS

Type of residuum produced	12 A.P.I.	A.S.T.M. No. 6	Coke
Yields, vol. % of charging stock:			
Gasoline	39.2	44.5	60.1
Residuum	56.8	52.8	...
Gas and loss	2.0	2.9	...
Coke, gas, and loss	...	...	39.9
Coke, lb./bbl. charging stock	...	...	65.5
Gas, cu. ft./ bbl. charging stock	191	209	904

made in a single cracking coil plant to produce (1) a 12° A.P.I. gravity residuum and, (2) a residuum having the mean viscosity requirements of No. 6 A.S.T.M. fuel oil; 400° F. end point gasoline was produced in both tests. The transfer temperature was 930° F. in both runs, the change in the character of the residuum being effected by increasing the pressure from 250 to 260 lb. per sq. in., and lowering the charging rate. A two-coil cracking recycle run was also conducted wherein more intensive conditions were employed to produce coke. In this run the transfer temperatures were 902° and 954° F., and the pressures were 250 and 400 lb. per sq. in. for the heavy and light oil coils, respectively. The yields of products from these three operations are shown in Table 7.

Table 8 summarizes the properties of the untreated gasolines, the liquid residue from the first two runs, and the coke from the third run. The use of 0.025 per cent of No. 1 inhibitor reduced the copper dish gum to 10 mg. in the case of the gasoline from the No. 6 fuel oil run and the coking operation. This amount of inhibitor was not as effective in the case of the

TABLE 8—PROPERTIES OF UNTREATED GASOLINES, RESIDUUM AND COKE

Type of residuum produced	12° A.P.I.	A.S.T.M. No. 6 Fuel oil	Coke
Untreated gasoline:			
Gravity, °A.P.I.	57.5	58.1	59.4
Specific gravity	0.7487	0.7463	0.7412
Color, °Saybolt	5	9	13
Doctor test	Pos.	....	Pos.
Gum, mg./100 ml. (copper dish):			
Without inhibitor	69	27	17
With inhibitor (0.025%)	46	10	10
Sulfur, %	0.19	0.16	0.19
Oxygen bomb stability, induction period, min:			
Without inhibitor	120	135	120
With inhibitor (0.025%)	165	215	205
Octane No.:			
(A.S.T.M.)	69	69	74
(Research)	74	..	81
100 ml. A.S.T.M. distillation:			
I.B.P., °F.:			
10%	150	158	156
50%	272	276	236
90%	378	373	356
E.P.	394	397	380
Residuum:			
Gravity, °A.P.I.	11.5	10.5	...
Specific gravity	0.9895	0.9965	...
Flash (Cleveland open cup) °F.	280	270	...
Fire (Cleveland open cup) °F.	325	310	...
Flash (Pensky-Martens) °F.	188	215	...
Viscosity Furol at 122° F., sec.	123	214	...
Cold test, °F.	0	15	...
B. s. and w., %	0	0.1	...
I.B.P., °F.	420	472	...
U.O.P. characterization factor	11.05	11.02	...
Coke, % by weight:			
Moisture	...	...	0.16
Volatile matter (dry)	...	...	9.92
Ash	...	...	0.69
Fixed carbon	...	...	89.23
Total	...	...	100.00
Sulfur	...	...	2.58

TABLE 9—TREATMENT OF CRACKED GASOLINE

Treatment	Sulfuric acid split caustic
Acid, lb./bbl.	4
Acid, % by weight	1.53
Acid solution loss, % by vol.	1.0
Polymerization loss, %	0.7
Distillation loss, %	2.2
Total loss, %	3.9
Yields:	
Finished cracked gasoline: % raw gasoline	97.1
Raw gasoline: % charging stock	39.2
Finished cracked gasoline: % charging stock	38.0

TABLE 10—PROPERTIES OF TREATED GASOLINE

Gravity, °A.P.I.	56.5
Specific gravity	0.7527
Color, Saybolt	23
Color stability*	18
Doctor test	Neg.
Gum, mg./100 ml. (copper dish):	
Without inhibitor	6
With inhibitor No. 1 (0.025%)	5
Sulfur, %	0.09
Oxygen bomb stability, induction period, min.:	
Without inhibitor	95
With inhibitor No. 1 (0.025%)	550
Octane No. (A.S.T.M.)	67
100 ml. A.S.T.M. distillation:	
I.B.P., °F.	110
10%	165
50%	273
90%	368
E.P.	396
% distilled over	97.0
% bottoms	1.0
% loss	2.0

*Equivalent to 2 hours noon June sunlight.

gasoline produced in the 12° A.P.I. residuum run. The sulfur contents of all three gasolines were low. The coking run produced a 74-A.S.T.M.-octane-number gasoline, while the two residuum runs gave 69 octane number.

The gasoline from the operation producing 12° A.P.I. residuum was treated with 30° B. sodium hydroxide solution, 4 lb. per bbl. of 93 per cent sulfuric acid, and sodium hydroxide for neutralization, after which it was rerun with fire and steam using a maximum temperature of 350° F. The principal data and yields from this treatment are shown in Table 9, and the properties of the treated gasoline are shown in Table 10. The treated gasoline showed a satisfactory gum content without inhibitor, although inhibitor was required to raise the induction period above 240 minutes. The acid treatment lowered the A.S.T.M. octane number from 69 to 67.

G. B. MacGlashan has been appointed manager of the light oil department of Shell Oil Co. in San Francisco. MacGlashan previously was wholesale sales manager of the company's Oakland division.

John A. Porter, division clerk in Midland, Tex., for Humble Oil & Refining Co., has been promoted to assistant chief clerk in the Andrews, Tex., district.

Apparatus for Screening Catalyst

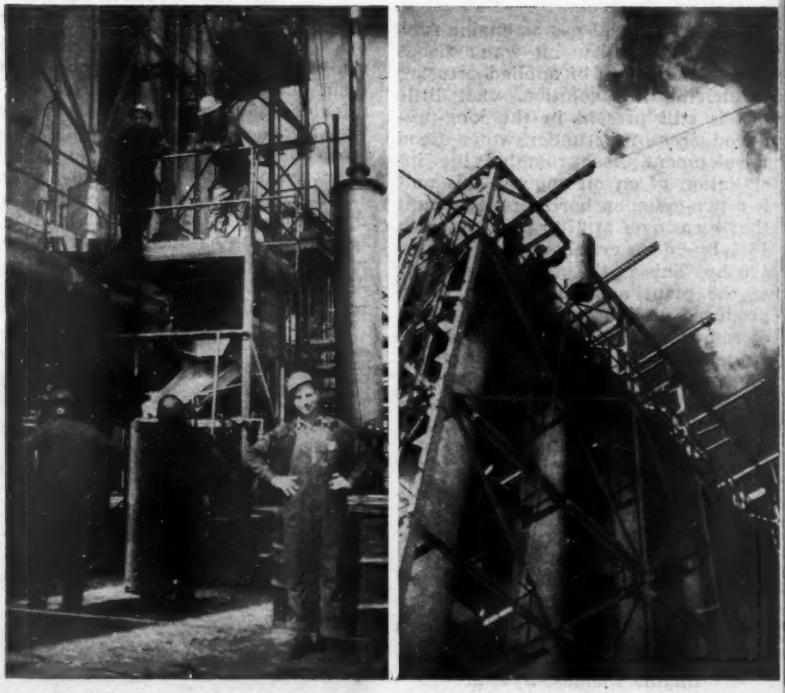
IN order that the catalyst unit be kept in the highest possible production efficiency, careful screening of the catalyst is practiced regularly by a large refinery manufacturing cumene. The screening apparatus is homemade and works in conjunction with a set of hoisting drums so that both the operation of screening and filling the columns are continuous.

The compact shaker assembly has a frame of angle iron placed on an I-beam foundation which allows skidding from one column to another with a winch and drag line. A platform is mounted on the top of the structure, surrounded by a railing. Fines pass through the wire mesh to drums at the rear while the normal pellets float from the wire mesh to the hoisting drums.

The thought first advanced was to adapt a rotary well-drilling shale shaker to screening the catalyst, but after analyzing the action, it was discovered that severe shock would produce more fines. A slow-motion vibration was developed by building the screen frame to be supported on long hangers, which are automobile connecting rods taken from a salvage yard. The power to operate the screen is a small air motor having adequate cams placed on the shaft and connected by rods to the shaker frame. Pins are attached to the feeder-funnel frame to connect the upper end of the connecting rods, while the babbitted ends are attached to sleeves on the shaker supporting shaft. Grease cups are used to provide lubrication. Any operating speed can be obtained by throttling the air flowing to the motor.

The hoisting drums are tall cylinders equipped with a lifting bail and fitted with a drop-hinged cover at the bottom. The cover is held closed by a bar passing through opposite slots in the walls of the cylinders. One end of the bar is drilled to receive a locking cotter pin to prevent accidental unlatching of the cover after filling. Each catalyst column is provided with an extending boom made of conventional trolley track for hoisting and moving the filled cylinders. When directly over the opening of the column, one operator removes the locking cotter pin, and another slides the locking bar from beneath the hinged cover, dumping the load of catalyst into the column.

Two air-operated hoists are employed while the work is progressing, one to lift the containers from the working area to the platform above the screen-feeder funnel, and the other to raise the cylinders to the top of the column structure.



Left: Catalyst shaker built in steel frame with platform at top on which men stand to dump containers of catalyst into hopper for separating usable pellets from fines. Right: Drum being hoisted to top of catalyst column when filling with fresh material. Booms at top have trolleys, stopped at end while hoisting

Kansas Water-Flood Plant Incorporates New Features in Engineering Design

by Frank B. Taylor

Described in this article are some of the innovations in design and construction which have been made in the water-flood plant being completed by Kewanee Oil Co. in the Bush City shoestring field near Garnett, Kans. Of special interest is the system in which utilization is made of the engine exhaust temperature to heat the plant building. The arrangement insures complete ventilation of the building.

CONSTRUCTION is nearing completion on Kewanee Oil Co.'s water flood plant on the Bush City shoestring on the Anderson County line east of Garnett, Kans. This plant, modern and complete, departs from usual installations in a number of respects although it is essentially typical of the fundamental requirements and advanced engineering design necessary to this type of recovery operation.

Lack of natural gas as engine fuel, a common problem on water floods due to the action of applied pressure in driving into solution what little gas is still present in the long-produced areas now under water flood development, has prompted the installation of an oil engine. This unit is a two-cylinder, horizontal type unit that turns over at 270 r.p.m. and with 13¼ by 16-in. cylinders that develop 120 hp. This is the main power unit of the plant and operates on crude produced on the lease. This crude is of somewhat higher gravity than the crude produced generally throughout the shoestring. A gravity check shows the oil to be 37° A.P.I. gravity. A sample sent to the engine manufacturer was analyzed and found entirely satisfactory for use as engine fuel.

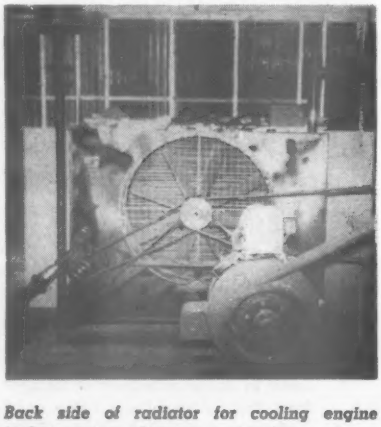
Crude to serve as engine fuel is contained in a small elevated tank adjacent to the main engine room, and feeds into the station by gravity flow. An overhead heat exchanger on the jacket water discharge line from the engine preheats the incoming oil to be used as fuel.

Engine Exhaust System

An unusual engine exhaust system is being employed; one that involves the use of the jet principle. The exhaust from the main engine is carried by dual 8-in. lines through the main plant foundation, and these terminate in 45° risers that extend above the surface outside the building. The two ends of each of these two angled risers terminate a few inches within 12-in. conductor pipes which enclose the actual exhausts. The 12-in. lines terminate at the face of the engine well.

Side view of radiator and louvre installation for cooling engine jacket water, with side door of temperature control housing removed

Fired gas from the engine, in exhausting and expanding from the end of the exhaust lines creates a "pull" through the 12-in. enclosing lines and induces a flow from the engine cellar through the annular space between the two lines. As the opening into the conductor pipe is in the engine cellar or pit, and as this pit houses the engine exhausts, and is interconnected with piping pits covered by steel grating the effect is to carry both heat and fumes outside the building.

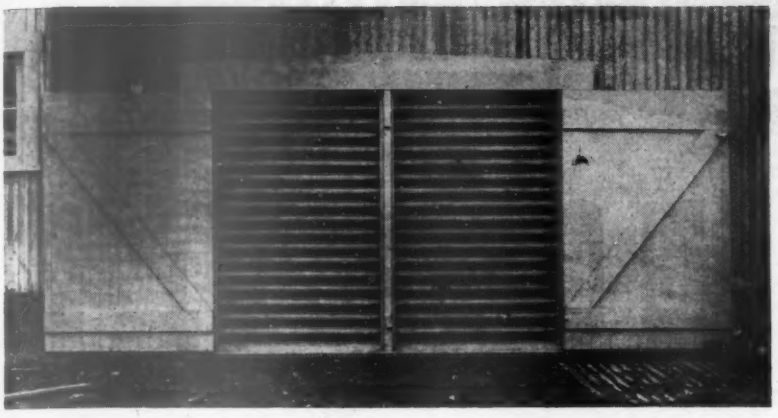


Back side of radiator for cooling engine jacket water showing motor-driven fan

Rigidity of the exhaust system is made positive by having four equally spaced ⅝-in. bolts penetrate the 12-in. from the outside to contact the outer surface of the enclosed 8-in. pipes. This, in addition to establishing rigidity, allows for adjustment and centering of the inside pipe. The outside conductors are fixed to the surface by flanges bolted into the foundation, which is of concrete.

Enclosed Water-Cooling System

Another innovation in water-flood-plant design is the use of a fully enclosed jacket water cooling system for the main unit. Water from the engine jackets, after passing through the heat exchanger previously mentioned, feeds into an 86 by 67-in. radiator with vertical tubes and close-



Outside view of louvres with doors (open) for controlling temperature

ly spaced horizontal fins. An 8-bladed 44-in. fan is mounted against the radiator driving air through from fan to tubes. This combination unit is placed on the station floor with the face of the radiator parallel to and about 18 in. from the station wall.

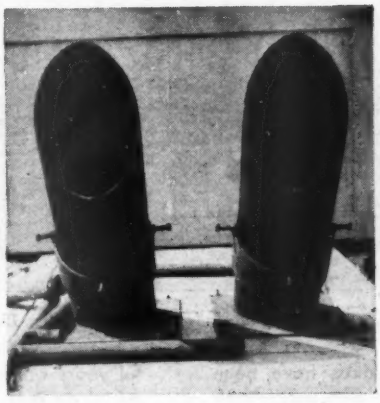
Water circulation through both radiator and engine jackets is by means of an impeller-type pump driven by V-belts from an outboard bearing on the radiator fan shaft, which in turn is V-belt driven from the main engine.

Air through the radiator is exhausted through a set of louvres inset into the side of the building. Double doors, hinge-mounted on the louvre framework on the outside, may be closed to block the air escape. The louvres are made of pieces of 1-in. lumber tilted down toward the outside.

At the top and both sides of the radiator a rectangular wooden shell has been constructed to span the 18 in. between the radiator face and the inner wall of the building. This shell consists of the necessary framework plus three doors into the 18-in. radiator-to-louvre space.

These doors, one on each side and one at the top, can be used to control the temperature within the building in cold weather. By shutting the two doors outside the station, the louvre escape is closed. By opening the side or top doors on the downstream side of the radiator, the warm air from the radiator exhausts inside the building for heat. Control of the temperature and the volume of air thus circulated within the station is possible by opening or closing the three inside and two outside doors as might be dictated by conditions.

The use of a totally enclosed jacket water cooling system incorporates other advantages additional to temperature control within the building. A spray pond or other jacket cooling method requires considerable makeup water. Pond water, whether derived from surface sources or from a



Engine exhaust risers on outside of plant building showing conductor pipe housing for ventilation

well drilled to subsurface water-bearing formation, contains suspended matter in varying amounts and is chemically saturated to varying degrees. This condition must be corrected to reduce to a minimum the amount of scale deposited in engine water jackets. Also, costly allowance must be made for the ever-changing characteristics of makeup water from pond or other source.

By the use of an enclosed water cooling system, it is economically practical to use fully treated and stabilized water because of the relatively small volume of makeup required.

General Plan

Water for flooding the project is being obtained from a well into Siliceous lime at 1,351 ft. A 5½-in. beam-operated casing pump is being used to lift the water from three streaks of saturation in the lime stratum. While no capacity test was made on the well, water rose to within 100 ft. of the surface and swabbing failed to keep up with the flow into the formation. The supply is considered ample for the project which will require about 8000 bbl. daily. Water from the supply well is fed into an open, earthen pond, and from this gravities into a treater tank of 100-gal. per minute capacity and into a clear tank, both being of wood. A gravity-type filter unit, cleaned by periodically flooding in reverse, is located in the main building. Water treatment controls and injection rates are electrically operated and regulated from the central plant.

Flood water pressure is gained in a vertical, 3½ by 7-in. triplex pump. A unitized air compressor for starting air and a light plant complete the main equipment at the plant. Initial injection pressure will be about 450 lb. per sq. in.

Flood water will be metered into 17 wells to initiate the project. Development is by the customary five-spot plan with new wells serving as all input wells. Old producers are converted to flood wells with the production to be flowed rather than lifted to the surface. The use of old wells as producers is considered satisfactory in this instance because these wells have been active producers until now, and this has prevented the formation of restrictive deposits of calcium and silt in the sand in the vicinity of the well bore. While original drilling of the present producers was not always according to a strict rectangular pattern, the divergence was minor and has not prevented the incorporation of such wells into the development plan. The spacing is generally 325 ft. between input and producing wells alike. Plans are to expand the project in the future if results warrant. Core data indicate that it will require 6 to 9 months to reach total saturation in the reservoir at which time producing wells should commence flowing.

Squirrel sand (Pennsylvanian) at 600-650 ft. is being flooded. Location of the project, 33-20s-21e, is on a narrow river-bed type of sand deposition that trends generally west-southwest and east-northeast. Other floods are in operation or are in the process of being started both to the west and east of the Kewanee project.

This and other producing properties in the area have generally been drilled to complete definition in past years, and are now approaching the stage of normal abandonment. However, successful introduction of water flood recovery in other sections of the shoestring have given many old leases new life and high recoveries may be anticipated in many of the projects. Some sections have been repressured to a limited extent, but this apparently has produced no sand conditions prohibitive to successful flooding; and the recoveries by various methods of gas and air repressuring were not sufficiently extensive or prolonged as to reduce remaining reserves to a point below economic operation of efficient water flood operations.

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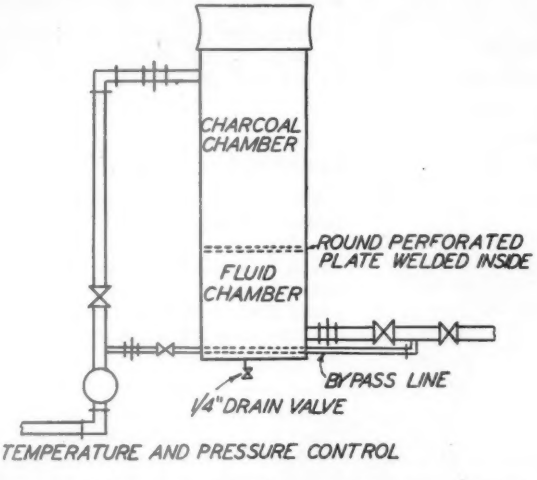
PLANT PRACTICES

Here are presented some of the suggestions submitted by employes of Humble Oil & Refining Co. under the company's "Coin-Your-Idea" program. These suggestions resulted in cash awards to the men submitting them. Additional ideas will be published in subsequent issues of the Journal.

Charcoal Scrubber on Gas Supply Line

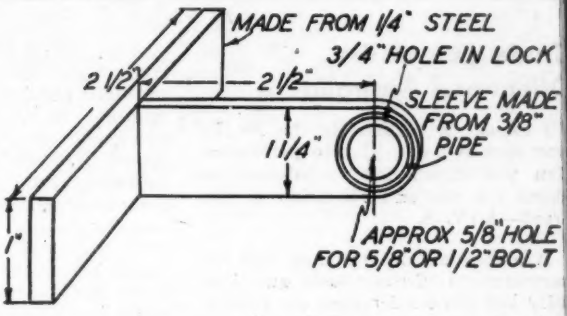
SCRUBBER is built of a 4-in. pipe nipple 16 in. long. A round plate with ⅛-in. perforations is welded inside the pipe 5 in. from the bottom. A plate is welded on the bottom of the nipple and a drain valve is installed. A top cap is made of a thread protector and plating. Domestic charcoal is placed in the top chamber;



gas from residue line enters the scrubber near the bottom and travels upward through the charcoal. A thin layer of steel wool is placed beneath the charcoal, to support it, on top of the perforated plate. To prevent charcoal from passing down the line, a small screen is placed over the outlet line. This scrubber cleans the gas, and prevents oil or water from interfering with the instruments. No instrument cleaning has been required since installing this device. (Idea submitted by Clyde C. Kelley, gas-plant operator.)

Valve-Locking Device

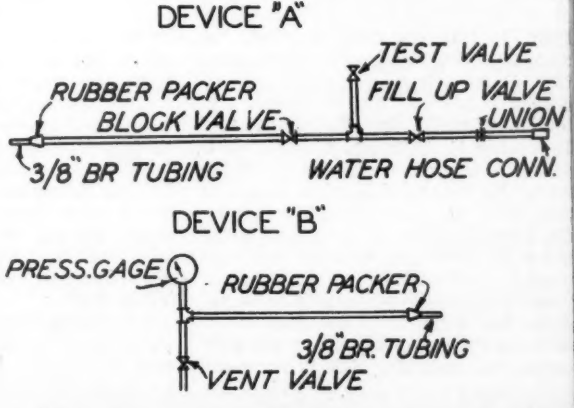
A SAFE, simple method for locking valves in any position is shown in the accompanying drawing. A lug is welded to the yoke or other part of the valve which is stationary, the lug having two parallel straps 1 in. or more in length, bored parallel for a bolt of the required size. The lock is made by welding a 1-in. strip of ¼-in. strap steel 2 in. long or more, as required by the valve to be locked, at the strip's midpoint to a similar strap of 3 in. long or longer; both these straps may be 1 in. to 1¼ in. wide. The opposite end of the longer stra is rounded on a half circle, and drilled for a sleeve mad of a short section of pipe of inside diameter to take th bolt required to fasten the device to the valve. This sleev is spot welded in place in the hole drilled or cut for i in the base of the strap with rounded end. The dimen sions of these items will vary with the dimensions an proportions of the valve to be fitted. For example, wit a 6-in. valve, the length of the strap carrying the sleev



for bolting to the valve will be 3⅜ in.; of the cross strap or handle, 2¾ in., and other dimensions in pro portion. The lock strap is bolted to the drilled lug, the parallel jaws of which are slightly wider apart than the thickness of this strap. When the valve is to be locked the movement is accomplished by pulling the crossbar handle upward until it passes between two spokes and leans against hub or handle. When the valve is to be moved the handle is thrown forward to drop between the spokes out of the way. (Idea submitted by J. L. Fulton, gager.)

Testing for Leaky Condenser Tubes

DEVICE "A" is fastened to a water hose and the copper tubed end is placed inside the tube and water turned on; when the tube is filled with water the fillup valve is closed, then the block valve is closed, test valve is opened to see if the block and fillup valves are holding. Device "B" is placed in the opposite end of the same tube, holding the tapered rubber packing tightly in the tube end, with vent valve open until all air is



ejected and gage is up to the water pressure. Operator of device "A" cuts off water and checks on gage to see if the pressure drops; if so the tube is leaking. If pressure is maintained, the tube does not leak. This is the only known simple method by which tubes can be checked for leaks while inside the shell. (Idea submitted by Fayette Wallace, roustabout.)

QUESTIONS ON TECHNOLOGY

by W. L. Nelson

Crude Oils of the Orient and Australia

I expect to be sent to the Pacific war area as a specialist in petroleum. Can you direct me to information about the oils and oil fields of this area?—A. V. S.

It is beyond the scope of this department to discuss such questions fully but some references are readily at hand. Most useful of these is the International Number of The Oil and Gas Journal, December 25, 1941. In this issue, the following items may be of value: (1) Drilling Possibilities in Asia (p. 85), and in the East Indies and Australia (p. 87); (2) World Oil Refineries Survey (pp. 107-117); and (3) Survey of World Oil Fields (pp. 117-123). A somewhat similar but older source is the World Oil Survey Number of Oil Weekly, March 18, 1935, but this source gives little information of crude oils or refineries.

The crude oils of Japan, Dutch East Indies, Burma, Iran and Iraq, are discussed on pages 886-897 of Vol. 2 of Science of Petroleum, by Dunstan et al, and published by Oxford Press (1938).

The characteristics of the crude oils of these areas are presented in Bulletin 401 of the Bureau of Mines (1937) entitled, "Properties of Typical Crude Oils From Fields of the Eastern Hemisphere." The bulletin gives analyses of 59 crude oils from such areas as Iran (3), Iraq (1), India (8), East Indies (28), New Zealand (1), and Japan (18). Crude oils from Burma are discussed in a paper by Dr. Gustav Egloff in The Oil and Gas Journal of December 11, 1930 (pp. 46-133). Analyses of a few crude oils, notably those from the Japanese-Russian island of Sakhalin, are given in the paper by Dr. Egloff in The Oil and Gas Journal issues of December 31, 1936, and January 7, 21, 28, 1937.

Although the crude oils of these regions are classified as paraffin, intermediate and naphthene base, many of them are unusually rich in aromatic hydrocarbons. There is no widely accepted method of classifying such types of crude oils, the name aromatic base being misleading because even the oils richest in aromatics seldom show more than 20 or 30 per cent of aromatic hydrocarbons and most of these special oils contain less than 12 per cent of aromatics. On an average, the gasoline obtained from crude oils of these regions has a higher octane number than those obtained elsewhere in the world. The best aviation-grade gasolines probably have octane numbers of 73 to 76. Two Japanese crude oils reported in the September 23, 1937, issue of The Oil and Gas Journal (p. 62) contain gasolines (about 250° F. at 90 per cent) which had clear octane numbers of 75 or 76. A further indication of the aromatic nature of some of these gasolines and crude oils is given on the Questions on Technology page (50) of the November 4, 1943, issue. The highest aromatic content gasolines shown in this source are those from Borneo and Burma.

Yield of Gasoline by Topping and Cracking

Can you give us information similar to that given in your question of "Gasoline Yield Versus A.P.I. Gravity of Crude Oil," but for both topping and cracking of a crude oil?—A. R. G.

Crude oil is seldom completely cracked for the production of gasoline and hence formulations similar to those published on May 25 are of little value. Furthermore, such equations are so complicated that they are of little value.

For these reasons, it would seem best to estimate the yield of gasoline from the crude oil and the yield by the process of cracking, as separate operations or computations. The yield from the crude oil can be obtained by the equation given in the above-mentioned question or by familiarity with similar crude oils. The yield of gasoline by cracking can be obtained by the following simple formula, or by a more accurate one given on pages 300-302 of the second edition of Petroleum Refinery Engineering, McGraw-Hill Book Co., Inc., New York, 1941.

Per cent gasoline = 25 + 1.5 (S—T) in which S is A.P.I. of charge stock and T is A.P.I. of cracked fuel oil (often about 8 A.P.I.).

Thus, if the gravity of the charging stock (topped crude) is 24°, the yield of cracked gasoline will be 25 plus 24, or 49 per cent. Two or three more per cent can be made if the cracked gasoline is stabilized and the cracked gases are sent through a gas-recovery plant. In a similar manner the yields of gasolines from various topped crude oils are:

A.P.I. of topped crude (or gas oil)	Yield of cracked gasoline (per cent) Making 7 A.P.I. fuel oil	Making 11 A.P.I. fuel oil
30	59.5	53.5
26	53.5	47.5
24	50.5	44.5
22	47.5	41.5
20	44.5	38.5
16	38.5	32.5

In a most general way, the yield of straight and cracked gasoline is somewhat as follows for typical crude oils:

	Total gasoline	Notes
42 A.P.I. paraffin base	36	Cr. only gas oil
37 A.P.I. mixed base	51	.....
20 A.P.I. naphthene base	40	All cracked

Obviously much larger yields (up to 75 per cent) could be made with mixed and paraffin-base crude oils if the entire crude oil be cracked.

Linseed Oil for Brake Band

We have been using linseed oil and lard as a lubricant on a 14-in. face, 8-ft. diameter wooden wheel against which is applied a 14-in. steel brake band, in order to keep the wooden wheel from burning. The linseed oil is expensive. Perhaps you can suggest a substitute.—T. C. F.

The service appears to be one which involves slowing down the brake wheel at a rate slow enough to avoid breaking it or causing it to heat, but at the same time to bring movement to a halt. In other words, to avoid "grabbing," to provide some lubricating, but to also provide frictional resistance in a smooth manner.

It would seem that almost any drying-type oil might be substituted for the linseed oil. Among such oils are tung oil, rapeseed oil, and menhaden oil. Among the semidrying oils are cottonseed, corn, and soy-bean oils. Many of these oils are scarce. Undoubtedly larger amounts of the semidrying oils, such as cottonseed, corn, or soy-bean oils would need to be used than linseed oil. Although the rosin oils are not drying oils, their properties are such that a small amount mixed in a medium lubricating oil might be very satisfactory.

To some extent, mineral oils to which lard or lard oil has been added, are used for brake bands and might be satisfactory.

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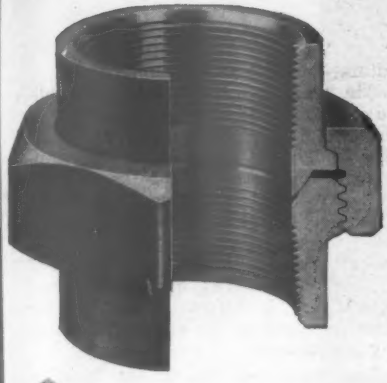

CATAWISSA Forged-steel Standard Unions—for general service. Heavy, coarse *true ACME* threads or U.S.S.V. threads.

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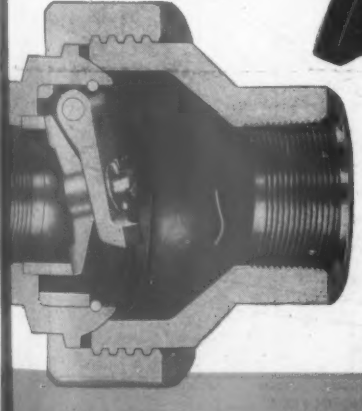
CATAWISSA Forged-steel Lug Nut Unions—*Standard and Double Extra Heavy.* For general service—especially suited for drilling rigs, Christmas tree hook-ups and other oil-field installations. *Union nut can be tightened with either a hammer or a wrench.* Heavy, coarse *true ACME* threads.



CATAWISSA Union-type Forged-steel Swing Check Valves— a practically indestructible pipe-union type check valve for high-pressure boiler-feed lines and heavy-duty service. Heavy, coarse *true ACME* union nut threads.

CATAWISSA Unions are hot-forged from rectangular steel bars. Seats are carefully hand-ground and are tested with air under water to assure holding qualities. The sealing contact is a 55-degree angle on the female end to a ball on the male end—insuring a perfect seal even when the pipe is not in perfect alignment.

Heavy, coarse *true ACME* union nut threads are a Catawissa feature which has proved outstanding for quick-opening, quick-closing applications. There are many other high-quality features which contribute to the *proved dependability* of Catawissa Forged-Steel Unions and Union Check Valves—and result in lowest cost to you in the long run.

Furnishing high-grade supplies for all oil and gas field needs, through stores located for your convenience, is part of "Oilwell's" 10-point Supply Service. Call the nearest "Oilwell" store or office for dependable Catawissa Forged-Steel Unions and Union Check Valves.

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"OILWELL"

Oil-Well Pumping Practices—No. 38

Factors Affecting Servicing and Reconditioning Pumping Wells

by J. Zaba

This is the second of a series of four articles comprising the appendix to the series on Oil-Well Pumping Practices. The first installment of the appendix, appearing in the June 24 issue, discussed sonic methods of determining fluid levels. Servicing and reconditioning of wells, discussed in this installment, are other important phases of operation affecting pumping production.

THE question of servicing and of reconditioning of pumping wells is a subject in itself and only its most general aspects can be referred to within the framework of this series. The term "well servicing" refers primarily to those routine operations the purpose of which is to keep the surface and subsurface equipment of pumping wells in mechanically satisfactory condition, thus assuring economical and efficient lifting of oil. Well "reconditioning" includes all those operations the purpose of which is correcting of certain definite conditions which caused drop of production of a well, before productive possibilities of the area, drained by the well, have been exhausted. Such conditions may be a result of characteristics of reservoir, of characteristics of the fluid handled, or they may be caused by the type of failure of the subsurface mechanical equipment which can not be corrected by routine servicing operations.

Well reconditioning, sometimes referred to as well repairing or working over of wells, developed during the past 10 or 15 years into a self-contained operational phase of the oil industry which occupies an intermediate position between the producing and drilling operations. The success of this new phase was a result of two groups of causes. First, new methods and new practices were developed which permitted better diagnosis of difficulties encountered and offered means for combating these difficulties. Second, development of highly portable well servicing units, clean-out rigs, etc., assured economic performance of the reconditioning operations.

Well-Servicing Units

In discussing the problems of oil-well servicing units, several factors have to be considered. These factors are: The power required for performing the work of lifting certain weight certain distance in a certain period of time; the speed of lifting this weight, which is necessary for performing the operation in the desired period of time; the engine torque available to start the weight and give it the necessary acceleration. These factors are closely interrelated and their consideration involves the questions of type of operation to be performed, amount of weight to be lifted, number of lines used, diameter of drum and size of line employed, the over-all gear ratio and the type of engine.

Power and Torque

As far as power requirements of oil-well servicing units are concerned the problem resolves itself into determining, first, the amount of weight which is to be lifted; second, the speed with which the operation is to be performed, and third, the extent of power losses between the tubing block and the engine.

The weight to be lifted can be calculated from the available data on unit weights of rods, tubing and fluid. The weight to be handled may consist of weight of rods or tubing only or of weight of tubing with fluid. The chart shown in Fig. 1 may be used for quick determination of different types of weights. The effect of buoyancy of fluid is disregarded since this effect is offset in general by friction losses in the well during lifting operations.

The speed of lift, or the time in which it is desired to lift the weight a given distance, will depend on type of operation performed. Speed of lift of 100 ft. per minute is usually considered as a minimum for efficient performance of normal routine operations although special operations may require much lower speeds. With known weight and selected speed the power required at tubing block can be calculated and expressed in terms of horsepower. The chart shown in Fig. 2 can be used for this purpose.

With known power requirements at the tubing block the power to be delivered by the engine can be estimated by taking into consideration friction power losses between the tubing block and the engine. These friction losses consist of those occurring in wire line and blocks and those occurring in the transmission system of the unit.

For commonly used blocks the friction losses per sheave are usually estimated at 2 per cent for roller-bearing sheaves and 5 per cent for plain-bearing sheaves.[1] This figure represents friction loss in one sheave in motion during lifting operations. By adding the losses in individual sheaves the friction losses of the blocks are determined. The power re-

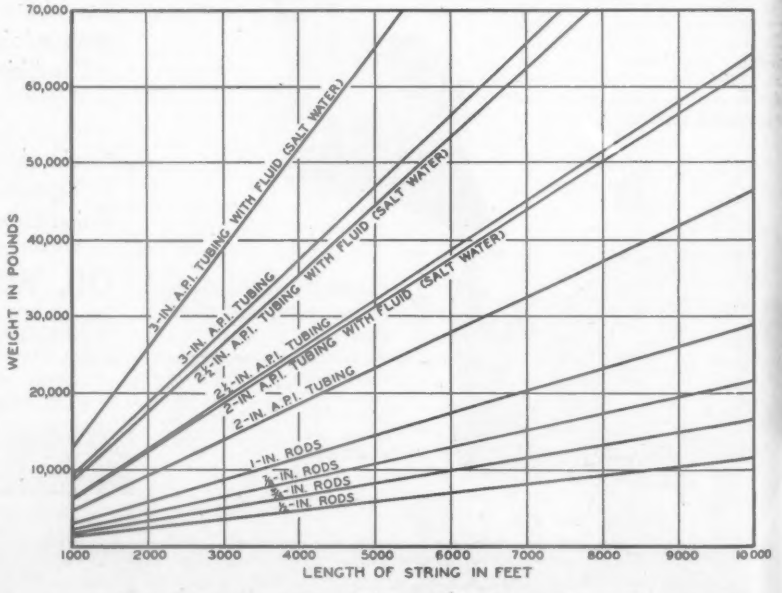

Fig. 1: Chart showing weights to be handled during well-servicing operations

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quired at the block, corrected for the friction loss represents power required at the drum.

The friction losses between the drum and the engine depend on type and on design of the unit. Table 1 gives average friction losses for different component elements of the transmission system. By adding the friction losses of elements present in transmission system of a given unit total friction losses between drum and engine are determined. Correcting for these losses the previously calculated power requirement at the drum, the power requirements for the engine are arrived at. The figure thus calculated is usually increased by factor ranging from 20 to 30 per cent. Care should be exercised in checking the rating of the engine selected since some of the engines are rated without accessories.

TABLE 1—FRICTION LOSSES IN DIFFERENT ELEMENTS OF A TRANSMISSION SYSTEM*

Element—	Friction loss per cent
Oil-bath roller chain on machine-cut sprockets (single or double chain using light oil)	2
Nonoil-bath roller chain on machine-cut sprockets	3-4‡
Oil field-type chain (open) on machine-cut sprockets	3-4
Oil field-type chain (open) on cast sprockets	4-5
V-belts on proper pulleys	2-3†
Gears in oil bath (heavy oil or gear grease)	3
Gears, open	4-5‡
Shafts on antifriction bearings	1
Shafts on plain bearings	2

†Depending on slippage. ‡Depending on lubrication.

The torque created by the engine is transferred by transmission, sprockets and chains to the drum where it expresses itself as the so-called line pull, representing the ability of the unit to lift the weight. The torque characteristic of the engine must be such as to meet the fundamental requirement of a well-servicing unit, which is starting the weight from a standstill and giving it acceleration without change of gears. To meet this requirement, the engine of the unit should develop its maximum torque at a comparatively low speed and should maintain this torque over a comparatively wide range of speeds. In other words, the torque curve of the engine should be reasonably flat from the point of its maximum. Although the multicylinder engines do not fulfill implicitly these requirements, they are being used, because some of their other characteristics, such, for instance, as weight, make them especially adaptable in portable-type units.

The relation between engine torque and ability of the unit to pull the weight can be expressed by the formula:[3]

$$P = \frac{T \times 12 \times 0.75 \times G}{R}$$

where

P = pulling ability of unit, pounds
T = maximum torque, pound-feet
0.75 = efficiency factor of the engine
G = total gear ratio
R = rolling radius of the drum

The ability of the unit to start the load is usually considered as two-thirds of its pulling ability.

The safe loading capacity of line, and of the derrick, has also to be considered. If the weight to be lifted exceeds the safe capacity of the line, or of the derrick, additional lines have to be used. This, however, reduces the lifting speed. To retain the original speed of lift it would be necessary to increase the drum speed. This speed, however, can be increased only to a certain limit if proper balance between the torque of the given engine and the weight to be lifted is to be maintained. Since, as previously stated, each of the routine servicing operations involves handling of different weights, the servicing unit must be so designed as to have a proper gear reduction in different speeds for different types of operations.

Line Speed[3]

In determining line speed for given engine speed and over-all gear ratio, consideration should be given to the increasing rolling radius of the drum as line is being spooled on the drum. The travel of the line can be expressed by the formula:

$$L = \frac{2 \times R \times \pi \times V}{12}$$

where

L = line travel, feet per minute
R = rolling radius of drum, inches
V = speed of the drum, r.p.m.

As successive wraps of the line are being spooled on the drum, its rolling radius increases with each wrap by the diameter of the line used. This

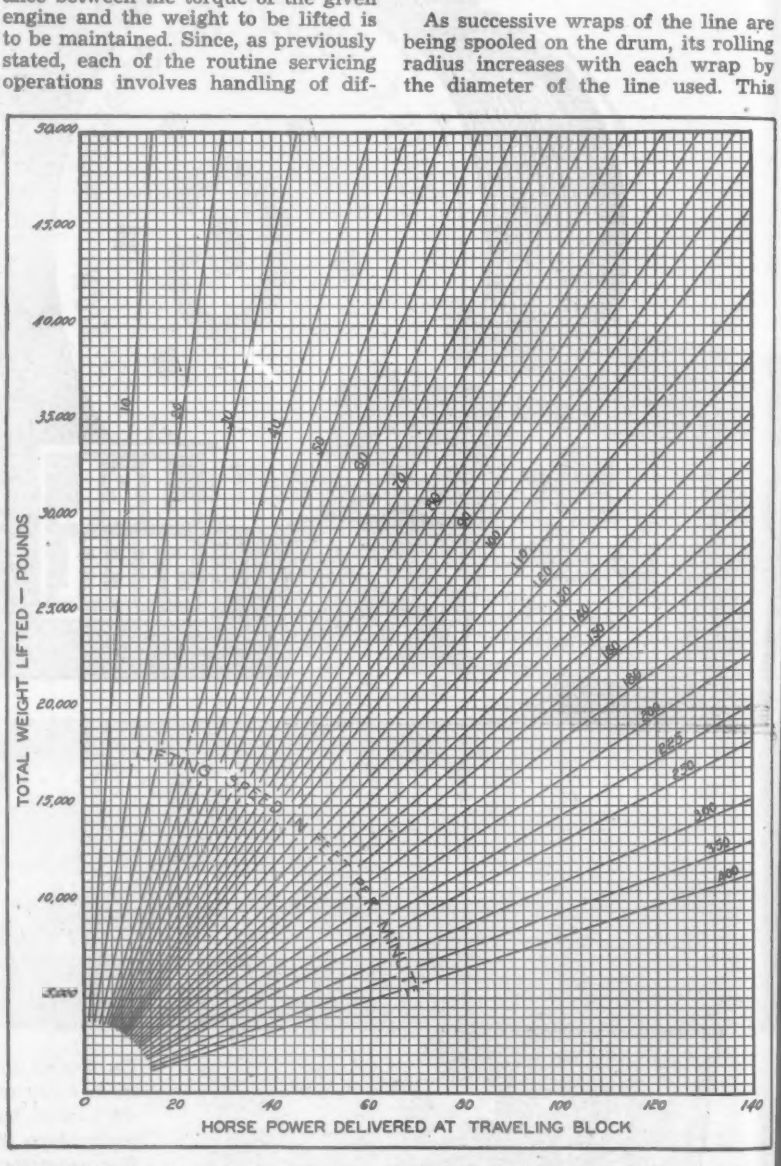

*Fig. 2: Chart showing amount of power required at tubing block to lift different weights at different speeds of lift**

*Courtesy Wilson Mfg. Co.

increases the line speed for given engine speed and given over-all gear ratio.

Well Servicing

As previously stated the purpose of well servicing is to maintain the mechanical equipment of the well in satisfactory operating conditions. The many possible routine repairs which are needed to maintain both the surface and the subsurface pumping equipment are well known and need not be discussed here. Of interest, however, may be a few remarks in regard to the economic side of well servicing. The economic question of the sucker-rod service already has been referred to in Installment 6 of this series.

In modern pumping practices the cost of well servicing is a subject of careful and continuous study. The analysis is usually made by breaking down the total servicing cost into costs of servicing the component parts of the pumping system, that is, prime mover, transmission, pumping unit, tubing, rods, and pump. This type of analysis permits detecting the costs of servicing these elements, which contribute a perhaps unnecessarily high share to the total servicing cost. It suggests the direction along which the improvement in total cost can be made.

The most commonly used basis for calculating the servicing cost of a well is the servicing cost per barrel. For the purposes of comparison, however, the cost per barrel is not a satisfactory medium, since it does not take into consideration the characteristics of the well, of the field or of the area. It has been suggested that a much more satisfactory basis of comparison from the standpoint of engineering studies is the cost per polished-rod horsepower hour.[5] As far as surface pumping equipment is concerned, with the exception of the prime mover, which is affected by transmission losses, the polished-rod horsepower hour is a measure of actual performance of equipment. It makes possible comparison of servicing of wells with different characteristics and with different types of pumping cycle. For the purpose of analysis of performance of the subsurface pumping equipment the cost per polished-rod horsepower hour becomes less definite because it does not take into consideration the factor of degree of corrosiveness of the fluid of different wells. It can be used, therefore, for comparison of performance only in wells with similar fluid characteristics.

Well Reconditioning

There is, of course, a large number of possible types of conditions which may bring about a drop of production of a well before its productive possibilities have been exhausted. As previously stated, they may be caused by characteristics of reservoir or of fluid, or by failure of subsurface equipment which can not be corrected by routine servicing. The conditions occurring most frequently can be generally grouped into three classes.[6] To the first class would belong conditions under which the production of a well is decreasing because of deposition on the face of the sand or within the well bore, by mechanical or chemical action, of agents which impede the entry of the fluid from the reservoir into the well bore or through the well bore to the surface. As far as entry of fluid into the well bore is concerned, these conditions are especially frequent, and particularly serious, in case of wells which are set with perforated liners or screens. To the second class would belong all types of sanding conditions. These conditions may range all the way from sand difficulties which cause drop of production of a well because of necessity of too frequent servicing, to complete sanding up. To the third class would belong intrusion of water.

Modern well reconditioning requires careful planning and execution to be economically successful.[6] Causes bringing about need for well reconditioning and problems of reconditioning operations will be the subject of the two concluding installments of the series.

Bibliography

1. Producing Equipment Directory—1940-41, p. N-29.

2. W. K. Atcheson: "Characteristics and Requirements of Portable Well Servicing Units" — Petroleum Engineer, December 1939.

3. E. H. Short: "Calculation of Well-Repair Expense"—The Oil and Gas Journal, July 22, 1943.

4. J. Zaba: "Workovers and Well Servicing—An Important Phase of the Gulf Coast Exploitation Practice"—International Oil, February 1942.

5. L. E. Elkins, R. H. Smith, L. F. Peterson and P. P. Manion, Jr.: "Mid-Continent Reconditioning Practices Entering New Era"—A paper presented before annual meeting of A.I.M.E., February 1943. See also Oil Weekly, March 29, April 12, April 19, 1943.

6. Producing Equipment Directory—1940-41, p. N-32.

O. R. Champion has resigned as district geologist in West Texas for Seaboard Oil Corp. to become Mid-Continent division manager of Alder Petroleum Corp., with headquarters in Fort Worth. **Surco J. Taylor,** a member of Seaboard's staff at Corpus Christi, has been moved to Midland to succeed Champion.

T. S. Haywood, district superintendent, and **H. L. Alverson,** general clerk, in the production department of Shell Oil Co., Inc., have been transferred from the Eagle Lake district to the Premont district, in Texas. **M. C. Fontenot,** district superintendent in the Cleveland, Tex., district, has been transferred to Eagle Lake.

BACK AGAIN on production — the famous McDonald Type "T" Safety Hat. Favorite of workers everywhere, this super-tough aluminum-alloy hat takes lots of punishment, delivers safety plus! The "T" hat returns with a new feature, too — an adjustable, full-floating headband that fits any head size, attaches instantly to either shell size, large or small. Toughest, coolest, most comfortable hard hat on the market — weighs only 11¾ oz. complete. Write for new Bulletin.

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Even though America's oil industry is producing more gasoline than all other countries put together—a critical situation now faces every American who drives a car...

There is a very real gas shortage that had to come when the mighty machine of war you have built went on the attack.

JUST TO GIVE YOU AN IDEA!...

It takes 3 tons of gas to "deliver" a 1-ton bomb!

Over half the total of all supplies shipped to the front is petroleum in one form or another!

Oil for one fueling of a battleship would heat an average house 350 years!

The oil industry has expanded swiftly and well. But—oil has many jobs to do. Oil makes synthetic rubber. From oil comes a basic ingredient for 4/5ths of all the TNT for bombs and shells. Oil makes a thousand things—including 100-octane aviation super-fuel...

And airpower eats up petroleum on a scale never before known. For example...

AVIATION GAS FACTS...

It takes about twice as much petroleum to make a gallon of 100-octane as to make automobile gas.

From 1942 to 1944, output of 100-octane aviation gas stepped up 8 times!

Training one pilot uses more gas than the average car uses in 18 years.

What it all adds up to is this... because *military* need for gas has stepped UP almost 4 times since 1942... less than 3/4 as much gas can be spared for the home front as in 1942!

This ration must cover essential needs first... farms, trucks, buses, industry, your doctor's car... and these are up 20% over what they were in 1942!

The shortage is real. Your help is vital.

YOUR PART IS THIS...

1. **Don't apply for more gas than you really need.**
2. **Get into a ride-sharing club and stick to it.**
3. **Endorse all your gas coupons now.**
4. **Don't take extra gas or coupons from anyone.**

YOU CAN HELP KILL THE BLACK MARKET!

The black market does not MAKE gasoline. It STEALS gas—currently some 2,500,000 gallons a day—from the essential home front supply left after military needs. It works chiefly with counterfeit coupons, peddled by the same gangs who deal in prostitution, bootleg liquor, dope, and other rackets. Many have been caught. More will be. *But without customers, the black gas racket would die overnight,* making more gas available for regular rationing. *Don't take extra gas or coupons from anyone!*

GASOLINE POWERS THE ATTACK—DON'T WASTE A DROP!

NOTE: *This is the* third *in a series of advertisements sponsored by the petroleum industry in District No. 1 (Atlantic Coast), appearing in Sunday newspapers and signed by oil companies which supply virtually all of the gasoline sold in District No. 1. Oil companies in the other districts are planning to run similar advertising.*

PREPARATION OF COST ESTIMATES

PREPARATION of cost estimates is one of the most frequent and difficult tasks encountered by engineers in the oil industry. Widely diversified conditions, operation in many different localities, and a multitude of unforeseen difficulties often result in inaccurate cost estimates.

A checkup on any job usually reveals many items which were substantially overexpended or underexpended on the basis of the original estimate. Although many of these items are excusable, an analysis usually reveals that many of the costs could have been anticipated if the original estimate had been carefully prepared.

One of the most frequent reasons for overexpenditure is the performance of additional work over that provided for in the original estimate. In some instances, this may be due to a change in plans between the time the authorization is made and the time the work is performed.

Oftentimes, an estimate provides for used equipment which may not be available at the time the work is performed. Consequently new equipment must be purchased and the costs are substantially increased. This is a frequent occurrence at the present time when, due to shortage of materials, it is impossible to earmark equipment for one particular job.

In general, the costs of materials can be estimated with a greater degree of accuracy than can labor costs. Overexpenditure on labor costs is usually due to failure on the part of the engineer to provide for all the necessary work. A provision for cleaning the location is universally neglected on most estimates, although this work is always necessary.

Changed plans and additional work over that which was originally specified, are plainly evident in most contract work where charges are made accordingly.

Typical cost estimates illustrating the foregoing points are shown in Table 1. The actual expenditure for each of the items listed is shown in the second column. It will be noted that both of these estimates cover the same general type of work.

The first cost estimate, covering the installation of pumping equipment at well "A," is surprisingly close to the actual total cost of the work. An analysis of various items shows a number of over and underexpenditures which cancel when the total cost is considered. The most noticeable differences are the contract and company-labor items. When the work was performed, company labor was used for part of the work which was originally estimated on the basis of contract labor.

The second cost estimate covering the installation of a steel rig front and derrick at well "B" shows an overexpenditure on practically every item. No provision was made in the original estimate for a crown block or much of the rig material. The amount of concrete was considerably underestimated.

The original estimate provided for a used engine, clutch, and outboard bearing. These items were used elsewhere before the work was performed and, consequently, overexpenditures occurred when it became necessary to procure other equipment.

TABLE 1

Cost Estimate No. 1—Install Pumping Equipment at Well "A"

Material:	Original estimate	Actual cost	Over	Under
20-hp. pumping unit	$1,675	$1,613	....	$62
Engine	685	621	....	64
Lubricating system for beam bearings	12	13	$1	....
Lumber	15	32	17	....
Concrete (ready mixed)	180	195	15	....
2-in. steel line pipe (SH), 350 ft.	48	37	....	11
Miscellaneous fittings	35	81	46	....
Bolts, oxygen, acetylene, misc. material	....	56	56	....
Pumping equipment	212	95	....	117
2½-in. EUE steel tubing (SH), 3,314 ft.	810	869	59	....
Sucker rods, ⅞ and ¾-in. (SH)	610	778	168	....
Labor:				
Contract labor	380	94	....	286
Company labor	260	589	329	....
Hauling:				
Hauling expense	120	85	....	35
Miscellaneous and overhead:				
Miscellaneous and overhead expense	75	118	43	....
Total	$5,117	$5,276	$734	$ 575

Overexpended—$159
Per cent error in original estimate—3 per cent

Cost Estimate No. 2—Replace Wood Front and Derrick With Steel Rig Front and Derrick at Well "B"

Material:	Original estimate	Actual cost	Over	Under
Steel derrick and bolts	$640	$631	....	$9
100 lb. seat, 268 steel beam, jackpost, sampson post, woodface bandwheel, shaft crank, bearings and miscellaneous rig irons (new and SH)	505	523	$18	....
Crown block	....	95	95	....
Engine house (steel frame)	83	127	44	....
G.O. iron	75	64	....	11
Concrete (ready mixed)	525	760	235	....
Lumber	115	109	....	6
Miscellaneous rig material	120	262	142	....
Steel circulating water tank	110	112	2	....
20-hp. (SH) gas engine, complete	350	536	186	....
Clutch and outboard bearing (SH)	112	261	149	....
Miscellaneous—oxygen, acetylene, bolts, etc.	35	76	41	....
Labor:				
Company labor, construction	360	536	176	....
Company labor, miscellaneous	20	132	112	....
Contract labor (erect derrick)	190	196	6	....
Hauling:				
Hauling expense	120	181	61	....
Miscellaneous and overhead:				
Miscellaneous and overhead expense	150	214	64	....
Total	$3,510	$4,815	$1,331	$26

Overexpended—$1,305
Per cent error in original estimate—27.2 per cent

What do you want in a pump?

MAXIMUM COMPACTNESS?

Pomonas require as little as one-fifth the floor space of other-type pumps of comparable capacity . . . a BIG saving wherever space is a factor!

FOOL-PROOF OPERATION?

Pomonas require no priming—a feature that not only eliminates complicated priming equipment, but also permits fully automatic operation from remote locations without risk of pump damage!

HIGH EFFICIENCY?

Pomona's unique semi-open impellers are readily adjustable to meet varying requirements of water flow without wasteful throttling. And, through advanced design, Pomona impellers drive the fluid through the pump without the abrupt changes in flow direction found in conventional pumps. Thus, maximum energy is concentrated on pumping the fluid—not wasted on overcoming internal flow friction!

TROUBLE-FREE SERVICE?

In Pomonas ALL bearings below the motor head are lubricated by the water being pumped. Reduces maintenance to a minimum and eliminates risk of contaminating water supply with oil or grease film!

WIDE ADAPTABILITY?

You can readily move a Pomona from one job to another—even from such widely divergent jobs as deep-well water supply to close-coupled line pumping. Cuts pump investment to the bone!

Here's Typical Pomona Performance!

A major oil company installed this Pomona Pump seven years ago to supply water for its field operations in a remote area where electric power was not available. For this reason, the pump was installed with a gasoline motor driving through an integral gear head.

Several years later electric power became available and the pump was changed over by simply replacing the gear head with an electric motor integral with the pump. *When you consider that this unit is direct drive with no pulleys or belts for adjustment, such versatility is noteworthy.*

Also typically Pomona is the fact that this pump is installed out in the open without even a shelter to protect it from summer sun, dust storms or winter rains. *Yet year after year, this pump has given outstanding trouble-free service . . . the kind of service that has made Pomonas top choice wherever water is pumped in field or refining operations!*

You'll find these and many other advantages in POMONAS!

IN FACT, *no matter what your pumping* job check with your nearby Pomona dealer on the *many* important savings that you can make by installing Pomonas . . . savings in installation costs, in operating costs, in repair and maintenance. Pomona capacities range from only a few gallons per minute to a flood of three hundred *thousand* gpm—and higher. There's a size to cut costs on your job!

POMONA PUMP CO.
A DIVISION OF
JOSHUA HENDY IRON WORKS

206 Commercial Street
Pomona, California

2850 Chippewa Street
St. Louis 18, Missouri

Pomona Products

DEEP WELL PUMPS

NIAGARA PUMPS

MINE PUMPS

LITTLE CHIEF PUMPS

Natural Gas

Kinsella-Viking Lease Awarded Northwestern

EDMONTON, Alta.—An agreement recently concluded between the Alberta government and Northwestern Utilities, Ltd., of Edmonton grants the company exclusive natural-gas rights on an area of 50,000 acres of crown lands, of which 44,397 acres are in Townships 47 and 48, Ranges 10 and 11w4, in the Kinsella field, and 5,514 acres in Townships 48 and 49, Ranges 12 and 13w4, in the Viking field. This acreage supplements 50,000 acres which the company already holds.

The agreement is for 21 years from January 1, 1944, and is renewable for a like period. The company will pay a yearly rental of 33⅓ cents an acre plus royalties on gas production fixed from time to time, the present royalty being 15 per ceht of the gas as produced. Provision is also made for oil development should oil be discovered by the company while drilling for gas.

Curtailment of Gas Waste in Louisiana Is Enjoined

NEW ORLEANS.—A meeting of oil operators and officials of the state minerals division to plan "further curtailment of natural-gas wastage in Louisiana" was urged by State Conservation Commissioner Joseph L. McHugh at the opening of hearings before the minerals division. McHugh declared that Louisiana already had been "singled out for praise as a leader in gas conservation as well as for its model oil and gas law."

Mayfield Named Engineer And Technical Advisor

HOUSTON.—M. L. Mayfield, petroleum engineer, has been appointed engineer and technical advisor for District 3 natural gas and natural gasoline petroleum industry committee, Petroleum Administration for War, with headquarters in this city. Mayfield previously had been serving as assistant director of the natural gas and natural gasoline division for District 3.

After graduating from University of Oklahoma in 1931, Mayfield worked for various oil companies in the Oklahoma City field. In 1934 he entered the junior engineers training course of Cities Service Oil Co. Later he was promoted to division engineer of the company's East Texas division. In 1940 he resigned to become chief petroleum engineer for the Cotton Valley operators committee at the start of the recycling and unit operation in the Cotton Valley field. In 1942 he became associated with PAW.

Peoples Plans Sale of Gas And Telephone Lines

HARRISBURG.—The Pennsylvania Public Utility Commission has received a request from Peoples Natural Gas Co. for authority to sell to New York State Natural Gas Corp. 90 miles of transmission gas line and a private telephone line extending from Limestone Township, Clarion County, to Hebron Township, Potter County. Both companies have offices in Pittsburgh, and the total purchase price is set at $815,256.

Plans to Increase Facilities In Kansas and Oklahoma

WASHINGTON. — Hearing will be held June 26 by Federal Power Commission in Oklahoma City on applications of Consolidated Gas Utilities Corp. to increase its facilities in Kansas and Oklahoma. The company plans to build and operate 5,280 ft. of 4½-in. pipe line extending from a connection with the applicant's 6⅝-in. line in Rice County, Kansas, to its existing distribution system in Sterling, Kans., and to abandon about 1½ miles of 5½-in. boiler-flue pipe line extending from its 8-in. line in Rice County to its 4-in. line, also in Rice County. It is planned also to construct and operate about 3½ miles of 8⅝-in. extending from the company's 6-in. line in Caddo County, Oklahoma, to a point of connection with the 8-in. line of Ray Stephens, Inc., in Caddo County.

Sebastian Named to Staff of Gas Technology Institute

CHICAGO. — Dr. John J. S. Sebastian has been named to the research staff of Institute of Gas Technology at Illinois Institute of Technology. He resigned as general manager of Balsam Mining & Manufacturing Co., Inc., Waynesville, N. C., to accept the appointment. Earlier in his career he was research engineer for Koppers Co., at Mellon Institute, Pittsburgh, and assistant chief chemist for Interlake Iron Corp., Chicago. For 11 years he was research associate in the coal research department at Carnegie Institute of Technology.

Dr. Sebastian will serve as associate supervisor of the coal and gasification research section of the Gas Institute. He will be in general charge of research on fluidized gas generation, upgrading of low B.t.u. gas, and related projects. He is a graduate of Royal Polytechnic Institute of Budapest and received his doctor of science degree at Carnegie Institute of Technology. He is a member of the American Chemical Society and Sigma Xi. Technical papers prepared by him have been widely read.

Hope Reduces Its Interstate Wholesale Rates $5,188,703

WASHINGTON. — Federal Power Commission this week accepted new rate schedules filed by Hope Natural Gas Co., Clarksburg, W. Va., which reduce interstate wholesale rates for natural gas sold to Ohio and Pennsylvania distributors by $5,188,703 annually.

Natural Gasoline

Natural-Gasoline Production Sets New High Record

WASHINGTON. — Daily average output of natural gasoline and allied products established a new high record of 10,959,000 gal. in April, according to U. S. Bureau of Mines. This compares with 10,906,000 gal. in March and with 10,039,000 gal. in April 1943. The biggest gain was in the South Louisiana district, where production from a cycle plant in the Erath field was included for the first time. Increases were reported also in Texas Gulf, Oklahoma, Kansas, Inland Louisiana, and New York.

Stocks dropped to 176,946,000 gal. from the 178,164,000 gal. reported on March 31, and they were 50,904,000 gal. below the inventories reported on April 30, 1943. Refinery utilization of natural gasoline rose, whereas cycle products and liquefied petroleum gases declined.

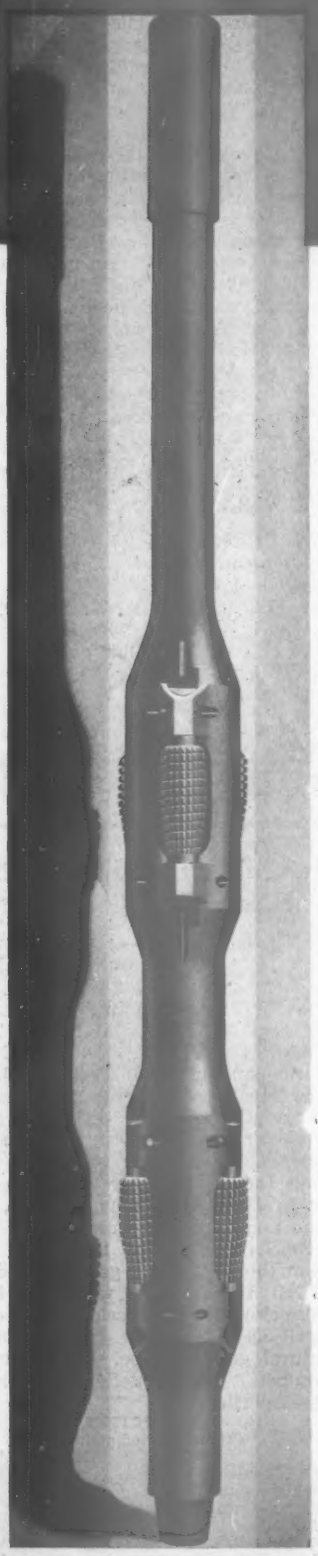
PRODUCTION
(Thousands of gallons)

	April	March
Natural gasoline	177,450	179,004
Cycle products	59,346	61,194
Liquefied petroleum gases:		
Isobutane*	15,792	21,000
Other L.P.G.*	76,188	76,902
Liquefied refinery gas	13,734	12,306
Benzene	8,400	8,400
Total production	350,910	358,806

*At natural-gasoline and cycle plants.

REED *Heavy Duty* REAMERS

FOR FULL DRILLING STRING *Stabilization*



6 CONTACT REAMER

FOR USE AS STABILIZER AT ANY LOCATION IN DRILL STEM

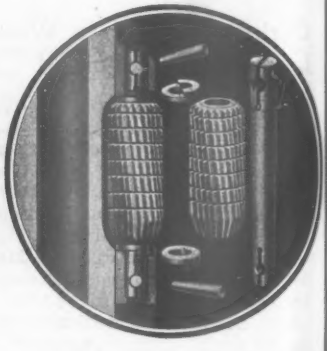
3 CONTACT REAMER

REED REAMERS are designed for extremely severe service, forged from selected alloy steel, carefully machined and heat-treated in specially designed furnaces.

The bearing blocks holding the reamer cutter assembly are specially case hardened and embedded in the reamer body by welding. The assembly is securely locked in the reamer body and cannot work loose and become lost in the hole.

For reaming operations or for stabilization of the drilling string while drilling, coring, testing, etc., specify Reed Reamers. The cutter assembly can be easily changed on the derrick floor.

Replaceable, specially heat-treated pin bearing blocks are deeply embedded in the reamer body and welded in place, making a solid, simplified, sturdy construction.



Oversized upper end of reamer pin makes changing easy, being held rigidly in place with tapered locking pins. No special tools are required to change cutters.

Reed

ROLLER BIT COMPANY

HOUSTON 1, TEXAS

MANUFACTURERS OF ROTARY DRILLING TOOLS FOR THE ESSENTIAL OIL INDUSTRY

REFINING

Arabian American Seeking Trained Refinery Men

Arabian American Oil Co., owned jointly by Standard Oil Co. of California and The Texas Co., is making a wide search for experienced men to construct and operate refineries in the Middle East, where it owns important oil concessions. A refinery which is to have a daily capacity of 50,000 bbl. is being built in Saudi Arabia, and an additional refinery unit is under construction on Bahrein Island, in the Persian Gulf. Other projects are said to be under consideration.

Arabian American is advertising for "technically trained men with experience in oil-field work or in refinery engineering design, construction or operation, for work in Saudi Arabia."

Refinery Patent Decisions Reversed, Ordered Reheard

PHILADELPHIA.—Two oil-refining patent decisions handed down by former Judge J. Warren Davis were set aside last week by Judge John Biggs, Jr., of the Third U. S. Circuit Court of Appeals, who ordered rehearings. Judge Davis' decisions upheld the legality of certain refining patents held by Universal Oil Products Co., of Chicago. They were against Root Refining Co. and Winkler-Koch Engineering Co. Root Refining paid royalties to Universal after the court's rulings had been entered 9 years ago. In accordance with Judge Davis' rulings other refineries had to take out licenses under the Universal patents and pay royalties.

Universal has denied any connection with allegations by Thomas Raeburn White, Philadelphia lawyer who acted as special master. Judge Biggs' ruling adopted White's findings and conclusions as those of the court.

White alleged fraud in an arrangement by Davis with Morgan S. Kaufman, Scranton, Pa., attorney and former federal bankruptcy referee, to lend $10,000 to Davis' cousin, Charles L. Stokley of Mount Dora, Fla. Kaufman, as attorney for Universal, got a $50,000 fee, although White said he did "little or nothing" in the litigation. Kaufman since has been disbarred and Judge Davis has resigned on an annual pension of $10,000.

Mexican Oil Refineries to Go on Three Shifts Daily

MEXICO CITY. — Oil refineries at Ciudad Madero, Tamaulipas, have been ordered by the management of Petroleos Mexicanos to work three shifts a day instead of one, in order to meet industrial, agricultural and other oil requirements while tank cars for the government-controlled company are available. There has been a shortage of these cars.

Since last week between 60,000 and 80,000 gal. of gasoline had been loaded in trucks of private companies and shifted to the states of Jalisco, Michoacan and the northern part of the country. This system of transportation has helped solve the oil shortages but has caused an increase in the transportation cost.

Refiners Urged to Give Air Fighters More Gasoline

WASHINGTON. — Urgent appeals for increased shipments of aviation gasoline are coming from fighting air forces, with the result that Bruce K. Brown, assistant deputy petroleum administrator, has sent the following telegram to all refiners:

"Cables from commanding generals in active theaters demand increased

We design and construct all types of modern refining units.
★ Serving the Industry Since 1915
BORN ENGINEERING CO.
Tulsa, Oklahoma

POWERFUL BEAM . . or Bright FLOODLIGHT WHEN YOU CARRY

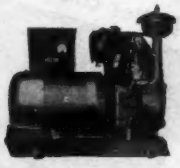
ECOLITE 72

This is a safe, efficient economical lantern that gives you a strong 1500 ft. beam or a bright floodlight. It is easy to carry, tilts and pivots, gives you lots of light where needed. Carries Underwriters' Laboratories recommendation for use in Class 1 Group D Hazards. Low price. See it at once. At Oil Well Supply Stores.

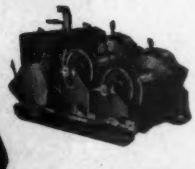
ECONOMY ELECTRIC LANTERN CO.
3100 W. CHERRY ST., MILWAUKEE 8, WIS.

LEADING CONTRACTORS PREFER Sterling
PUMPS • HOISTS • LIGHT PLANTS

DEPENDABLE RUGGED SIMPLE
•
SAVE MONEY SAVE TIME



EASY TO OPERATE
•
WRITE FOR CATALOG



STERLING
MACHINERY CORPORATION

shipments of aviation gasoline. The all-out air effort has resulted in serious reductions in combat theater stocks. Army Air Forces, Royal Air Force, and the Navy are presenting most urgent pleas for immediate shipments above and beyond all previous estimates.

"It will be necessary to ship up to 50 per cent more fuel than previously estimated for consumption in some of the more active theaters in the next 2 or 3 months. While Grade 130 fuel is the product shipped, increased production of components, butylenes, isopentane and isobutane for your own or other refineries is just as vital.

"Please push as hard as you possibly can. We have not enough today and will not have enough for several months. When and if full needs are met, every special facility will still be needed to produce high-quality components for a higher-quality fuel already authorized which will give increased offensive power and protect our airmen."

NLRB Directs Election On Union Representation

WASHINGTON.—The National Labor Relations Board directed an election among employes of Standard Oil Co. of New Jersey to determine union representation of five classes of employes. The election will be held within a month under regional NLRB supervision, the union to be voted on being the Standard Refinery Union, Inc., and unaffiliated labor organization.

Following a petition by the union, company officials and union representatives appeared at a hearing of NLRB, and the board reported that the union appeared to represent a substantial number of employes in the following categories: operating, mechanical and maintenance employes, clerical employes, laboratory employes, professional and technical employes, and militarized guards.

Less Premium Fuel for Use Of Civilians Is Ordered

WASHINGTON. — An immediate cut in the allotment of premium motor fuel for civilian use was announced last week by Harold L. Ickes, petroleum administrator, who explained that the order does not reduce the civilian supply of gasoline. Refineries will be permitted to step up manufacture of regular motor fuel, not higher than 72 octane, to compensate for the reduction in premium gasoline. Military demands for tetraethyl lead prompted the cutback in civilian supplies of premium-grade motor fuel.

Ickes said he had been forced to order a cut in premium gasoline for July, and for an unpredictable number of later months to about 40 per cent of the supply in June.

"In effect," Ickes said, "the cutback merely erases the increased sales of premium gasoline that have occurred since the outbreak of war and returns production of premium gasoline to the same levels that prevailed in August 1942."

Consumption of premium gasoline, around 76 octane, is estimated to have been 22,800,000 gal. daily in June.

Two Standard of Louisiana Men Cash in on Suggestions

Mike A. Payne, operator at the butadiene extraction unit in the Standard Oil Co. of Louisiana refinery, Baton Rouge, La., was judged winner of the second capital award in the Standard Oil Co. (New Jersey) "coin your ideas" competition. His winning suggestion was for the installation of a valve adjacent to the deabsorption towers in the solution inlet line at the butadiene plant.

Jules J. Guichet, assistant operator at the low-pressure cracking unit in the chemical products division, was awarded fourth prize in the central competition which includes winning suggestions from all operating affiliates of the Standard (N. J.) company.

McNAMAR
Steel Plate
Fabricators and Contractors
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Products storage
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Pressure vessels
McNAMAR
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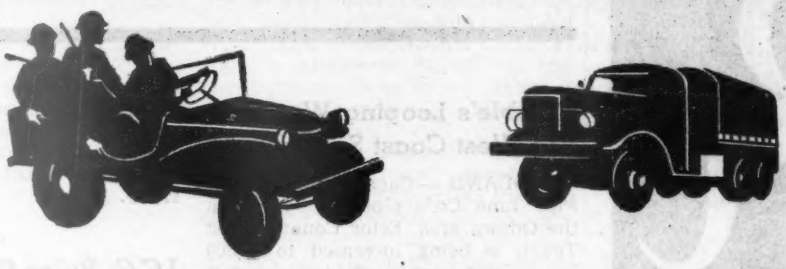
1286 E. Sedgley Ave.
PHILADELPHIA 34, PENNA.

To Refiners Contemplating the Manufacture of

80 OCTANE ARMY ALL-PURPOSE GASOLINE



GRAY Catalytic Desulfurization will insure maximum production of blended straight run and cracked distillates leaded to 3 c.c. Tetra Ethyl Lead and bring oxidation stabilities well within inhibitor control.

THE GRAY PROCESSES CORPORATION

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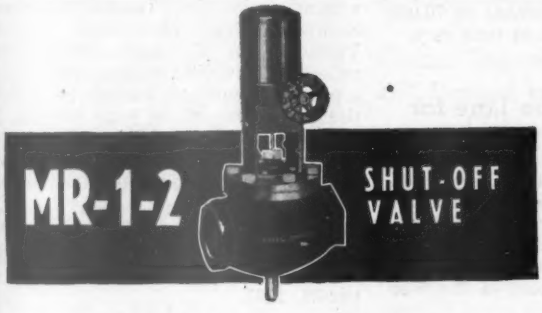

Gives Safe, Positive, Economical Operation

General Controls' shut-off valve, MR-1-2 is safest to operate. Current failure automatically closes the valve. Operation can only be continued by restoration of current plus manual resetting.

MR-1-2 gives positive control of water, gas, air, steam or oil. It is unaffected by dirty, viscous or high temperature fluids.

Current consumption is low. Dry cell operations can be minimized to 5/1000 watt. Operates on either D.C. or A.C.

Available in ½" to 6" I.P.S., screwed or flanged bodies. Most models operate in any position. Write for Catalog 52.

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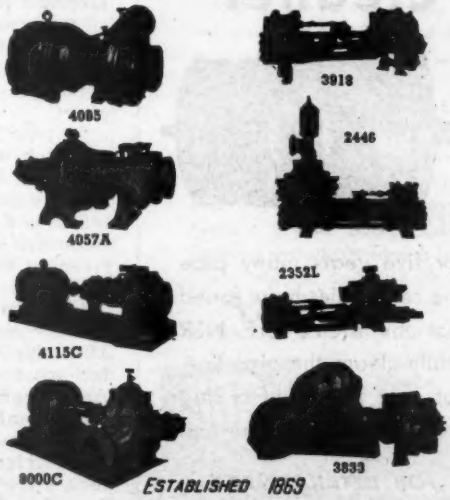

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CRUTCHER-ROLFS-CUMMINGS
Pipe Line Equipment and Materials
Houston, Texas, U. S. A.

MOLE
Pipeline
Cleaner

For five years many pipe line companies have found that the MOLE CLEANER really cleans the pipe line. Put it in ahead of a slug and see the dirt come out.

FOR DETAILS WRITE

Pipeline Cleaners Co.
Fort Madison, Iowa

PIPE LINES

Humble's Looping Work to Aid West Coast Supply

MIDLAND. — Capacity of Humble Pipe Line Co.'s pipe-line system in the Odessa area, Ector County, West Texas, is being increased to 10,000 bbl. daily by construction of a 6-mile 6-in. loop.

Crude handled by the Humble line will be delivered to the Atlantic Pipe Line Co. for transmission to Midland and there loaded in tank cars for shipment to California.

Shipments of West Texas crude via tank cars to the Pacific Coast will be increased to 25,000 bbl. daily over the next few weeks, it was reported here. The Petroleum Administration for War is encouraging increased shipments from West Texas to California in order to offset the substantial withdrawals from Pacific Coast stocks.

Recently, PAW's District 3 transportation committee was advised that railroad facilities would be available in November for movement of 70,000 bbl. daily to California in tank cars.

Morse Favors Pipe Line for Mississippi's Oil Fields

JACKSON. — Construction of the proposed pipe line from Mississippi's oil fields to Louisiana refineries is favored by H. M. Morse, director of the state Oil and Gas Board, as an economic project in support of the war effort.

"A pipe line from Mississippi fields to Baton Rouge and other Louisiana refineries would alleviate the growing strain imposed on the nation's railroads, and at the same time enable shipments of refined Mississippi oil by river to the sea for defense uses," said Morse.

"Allowance of some 180 miles of pipe line for construction of the proposed Mississippi-Louisiana venture, is of far more importance than is the Arabian project," said Director Morse. "It will take more than 850 miles of pipe to open—even in a small way—the foreign fields," he said. "Then there's the danger of constant breakdown in a foreign land," he said.

Secretary Ickes has favored the Arabian development, turning down requests for necessary materials to construct the proposed Mississippi-Louisiana tieup. At present crude oil is shipped to refineries throughout the nation. Several hundred cars are being used daily in transporting the unrefined product from Mississippi oil fields.

I.C.C. Rules Champlin Is Pipe-Line Company

WASHINGTON. — The Interstate Commerce Commission, in a recent decision, found against the Champlin Refining Co.'s claim that the company is not a common carrier, and ordered Champlin to submit information for valuation purposes. The decision was an affirmation of an earlier report.

The Champlin company, which operates a pipe line from Enid, Okla., to Rock Rapids, Iowa, together with terminals with storage tanks and rail and truck delivery facilities, claimed that it is not a common carrier nor a pipe-line company on the grounds that its principal business is not operating a pipe line. The I.C.C., citing Supreme Court precedents in the Valvoline Oil Co. case and others, ruled that the Champlin company is a pipe-line company and, further, that the operation of its pipe line is a common carrier operating in interstate commerce, since its products are sold at terminal points to other users.

The company was ordered to submit information in compliance with I.C.C. valuation orders within 90 days of the decision date, and as of December 31, 1943.

Interstate Authorized to Install New Compressors

WASHINGTON.—The Federal Power Commission last week authorized Interstate Natural Gas Co., Inc., Monroe, La., to abandon a section of pipe line not serving any useful purpose and to construct additional compressor facilities in Louisiana. The two compressors to be installed are not intended to serve new and additional markets, but solely to maintain service to existing customers. According to FPC orders the company is authorized:

1. To abandon and remove the northern 40,840 ft. of its 16-in. pipe line extending in a southerly direction for about 22 miles from Perryville, Ouachita Parish, to a point near

Alto, Richland Parish, Louisiana. The proposed abandonment and removal of facilities will not affect the company's service to any of its customers, the order says, and the applicant proposes to use the pipe and other materials recovered in the construction of a gathering system to serve additional wells.

2. To construct and operate two additional gas compressors of 1,000 hp. each, with necessary housing and auxiliary equipment, at the company's DeSiard station at Fowler, Ouachita Parish, Louisiana. The facilities are required to maintain a constantly available capacity of 170,000,000 cu. ft.

Freedom Oil Co. Acquires Control of Valvoline

The acquisition by Freedom Oil Co., Freedom, Pa., of a large majority interest in the Valvoline Oil Co., with headquarters in Cincinnati, Ohio, brings together two old and long-established companies in the Pennsylvania oil region. Announcement of this purchase has been made simultaneously by Earle M. Craig, president, and William G. Bechman, executive vice president, of Freedom, and G. P. Doll, president of Valvoline.

The original Freedom company was started in 1879 and now operates its refinery at Freedom, and distributes its lubricating oil products nation wide. Valvoline, originally established in 1866, with assets now in excess of $7,500,000 and annual sales of more than $9,000,000, operates a pipe line gathering its crude through the entire Pennsylvania region from the New York state line into southern West Virginia and eastern Ohio, operates a refinery at Butler, Pa., and distributes products in all states of the union, Canada, also abroad in England, India and South Africa.

The Valvoline company will be operated by their present officers and employes with the exception that the following Freedom officials will become officers of the company: William G. Bechman, chairman of the board; Earle M. Craig, chairman of the executive committee, and C. Lloyd Archer, treasurer.

The original stock purchase agreement for the control of Valvoline stock was acquired by Jay Levine associates of New York and assigned to Freedom.

Zenith Completes Line From Alva to Cherokee Takeoff

ALVA, Okla.—Zenith Gas System, Inc., of this city has finished construction of a 9-in. pipe line extending 4 miles from the Alva takeoff to the Cherokee takeoff. It takes the place of a 6-in. line.

Canol Expense Included in Bill Passed by Senate

WASHINGTON. — A War Department appropriation bill totaling $49,107,785,795 was passed unanimously by the Senate last week after Senator Ferguson (Michigan) abandoned his efforts to strike out the appropriation for the government-financed Canol oil-development project in Canada.

Senator Ferguson, although announcing he had given up his fight, termed the project "utterly fantastic." Asserting he understood the joint chiefs of staffs had assumed responsibility for an additional $16,439,683 allowance for the $130,000,000 project, he declared he would not stand in their way. He added, however, "It is a responsibility for which they will have to answer after the veil of secrecy is lifted. And, I am giving notice now that I am going to want to know in detail why they took the responsibility."

The Canol project so far has cost $129,000,000, of which $14,240,000 went for production of oil and exploratory work; $50,635,000 for crude oil pipe lines and pumping stations; $24,980,000 for refineries, and $30,315,000 for distribution pipe lines and pumping stations.

Reilly
PIPE ENAMEL
FOR
DEPENDABLE
PROTECTION
On Oil, Gas, Gasoline and Water Lines
Reilly COAL TAR PRODUCTS
17 PLANTS To Serve THE NATION
REILLY TAR & CHEMICAL CORPORATION
Merchants Bank Bldg., Indianapolis
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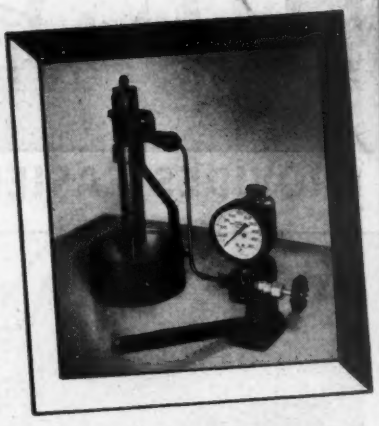
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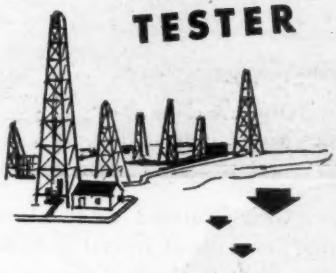
KEEP DIESEL ENGINES RUNNING AT PEAK EFFICIENCY
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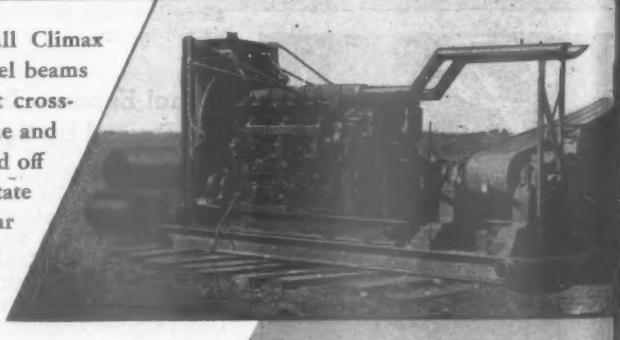

These skids, furnished as standard equipment on all Climax engines, are made of special wide-flange structural steel beams bolted directly to the box type engine base. Sufficient cross-members are used to make a rigid mounting for engine and all accessories. The radiator end of the skids is rounded off and welded to a heavy steel pipe cross-piece to facilitate handling. The power take-off end is held in a similar manner but has a built-up boiler-plate section to support the take-off shaft. This support keeps the shaft in alignment and prevents damage to clutch and bearings from shock loads or belt side-pull.

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3. Maintain tappet clea those shown on engi plate. Check every w with thickness gau
4. Keep fuel clean.
5. Keep outside surfa gine clean and dry t ignition harness fail

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Exploration and Drilling

Week's Highlights

ARKANSAS may be getting its third new pool discovery of the year, and a very important one, if preliminary indications are borne out by final developments. Carter Oil Co. 1 Wilson, SW NW 33-16s-18w, just outside the Mount Holly townsite in Union County, will be watched with unusual interest when final completion tests are made, which incidentally will be somewhat delayed owing to the collapse of the derrick after pipe was set and cemented.

Because of an unusual amount of care in testing as the well was drilled, and thorough coring, which was almost continuous after the initial 2 ft. of penetration of the Smackover, there is an excellent picture of the potential reservoir. The Smackover was topped at 6,903 ft., and coring began at 6,905 ft., and continued to 7,052 ft. This was followed by an electric log survey, which confirmed the porosity indications of the cores.

Indications are that the main porosity extends from 6,939-7,004 ft., or a probable 65 ft. thickness of pay zone of oolitic formation which may produce either oil and gas or condensate and gas. Of the 16 Smackover discoveries in South Arkansas since 1936, only 4 pools are credited with a pay thickness in excess of 65 ft., these being Macedonia and Midway at 75 ft. each, Magnolia 100 ft., and McKamie 106 ft. The Mount Holly pool, which lies about 2 miles south of the Carter test, was discovered in 1941 and the Smackover pay thickness is estimated at only 26 ft. The average thickness of pay for all 16 Smackover discoveries is approximately 46 ft.

The chances are that the new discovery will be a condensate field, whereas the Smackover production in the Mount Holly field to the south is 40 gravity crude oil. While not conclusive, this tends to bear out the opinion that the Carter well is on a separate structure, and is not likely to connect up with the older producing area. However, this is still subject to the usual geological uncertainties.

Surface elevation of the Carter well is 219 ft., which places the top of the Buckner at —6,510 ft.; top of the Smackover at —6,684 ft., and the interval between the two zones at 174 ft.

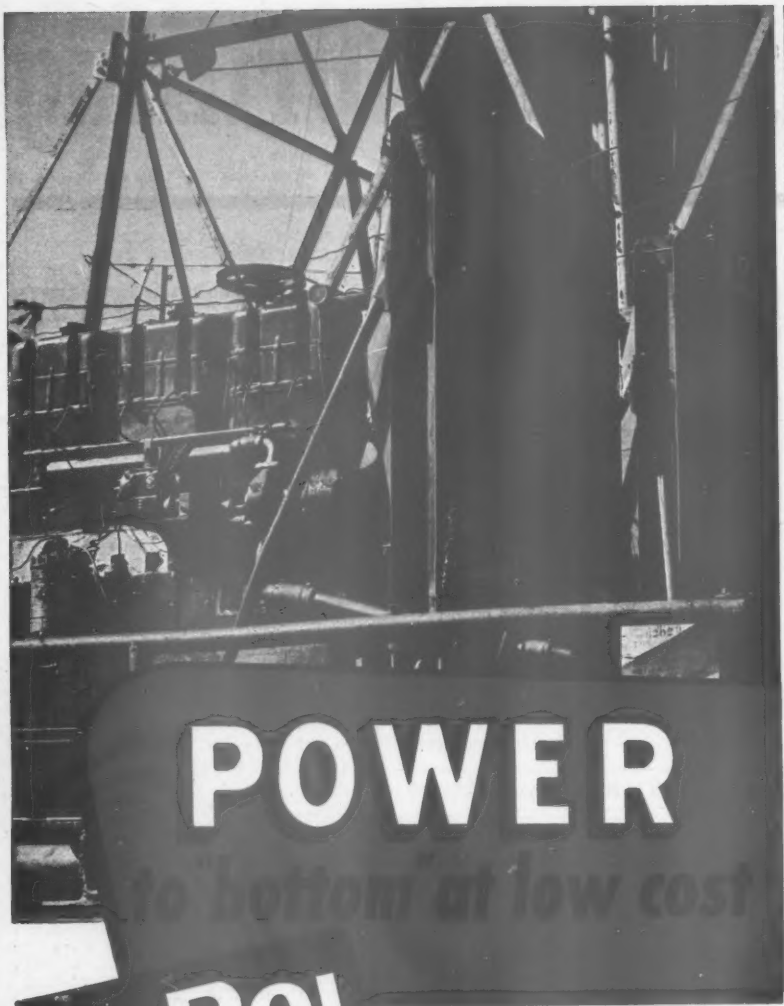
Solid line charts current weekly completions

COMPLETIONS IN ALL FIELDS . . .

Week ended June 24, 1944

	Oil	Gas	Dry	Total	Footage	Total Comp. to date 1944	1943
N. Y., Penna., W. Va.	47	13	2	62*	129,601	1,498	1,570
Ohio	5	9	4	18	39,586	438	388
Indiana	3	0	2	5	10,579	100	116
Kentucky	7	2	2	11	17,854	307	167
Illinois	32	0	13	45	118,728	795	796
Michigan	9	1	3	13	35,425	284	231
Kansas	25	2	15	42	138,842	815	727
Nebr., Mo., Iowa	0	0	0	0	0	15	21
Oklahoma	12	3	14	29	91,785	762	527
Texas:							
North Central	14	0	12	26	75,411	666	590
West	19	0	6	25	125,105	718	393
Panhandle	4	0	0	4	12,153	90	87
Eastern	4	0	4	8	40,751	158	130
Gulf Coast	22	4	11	37	265,687	509	201
Southwest	7	0	3	10	35,438	361	415
Total Texas	70	4	36	110	554,545	2,502	1,816
Louisiana:							
Northern	2	0	6	8	46,693	132	145
Southern	6	0	3	9	86,188	219	172
Total Louisiana	8	0	9	17	132,881	351	317
Arkansas	2	0	1	3	18,830	97	114
Mississippi	2	0	0	2	9,907	54	44
Southeast States	0	0	0	0	0	15	†
Montana	8	0	1	9	23,491	141	87
Wyoming	2	0	1	3	13,634	76	52
Colorado-Utah	0	0	1	1	3,005	15	6
New Mexico	6	0	3	9	20,300	193	103
California	24	0	9	33	110,540	917	598
Total United States	262	34	116	412	1,474,583	9,375	7,680
Total previous week	261	45	137	443			
Total June 26, 1943	189	38	111	338			

*Does not include 40 pressure wells. †Included in total shown for Mississippi.



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LE ROI

ROCKY MOUNTAIN

New Field Discovered in Eastern Wyoming

DENVER. — Continental Oil Co. has opened a new oil pool in Niobrara County, eastern Wyoming, at 1 Wright, NW SW NW 25-36n-64w, on the East Lance Creek structure, 6 miles east of the nearest producer in the Lance Creek field. After cleaning up it flowed 184 bbl. of 42.3-gravity oil from the lower section of the Dakota sand through 29 perforations in the 7-in. casing at 3,847-67 ft., in 8 hours, an average of 23 bbl. per hour. The upper zone of the Dakota also showed saturation in cores while drilling in sand at 3,816-30 ft., but it has not yet been tested. The Wright well is 3½ miles east of Continental 1 Leach in 29-36-64, which was completed in 1937 for 8,848,000 cu. ft of gas in the Dakota at 3,808-3,895 ft.

Small discovery north of Kevin-Sunburst.—The Texas Co. is exploring for a new pool on a nose running north and east of the Kevin-Sunburst field. Its 1 Wagner, NE SW NE 20-36n-1w, was completed in the Sunburst sand at 1,737-78 ft. for 12 bbl. the first 24 hours and after pumping off head it made 7½ bbl. in 22 hours. It is on what is known as the Willshaw block. Rig was moved 1½ miles west and a little north for 1 Mars, SE NW NW 19-36-1w,

Development begins at South Sunshine.—Eighteen years after the discovery well was completed development has begun on the South Sunshine structure on the southwest side of the Big Horn basin and southwest of the Little Buffalo basin and Gooseberry structures. Continental is moving in for 2 Wolf, SE NW NE 9-46n-101w, to go to the Embar at around 2,500 ft. It is an offset to 1 Wolf which was completed in 1926 in the Embar at 2,480-2,514 ft. for an average of 400 bbl. per day by the Union Oil Co. of California.

Oregon basin deep test.—Ohio Oil Co. is preparing to test shows of oil in the Jefferson section of the Devonian and the Deadwood zone of the Cambrian in its 13-w Samuels-OPC, NW NW NW 32-51n-100w, near the top of the south dome of the Oregon Basin field. Reports are that cores taken in the Jefferson showed good saturation and continued on into the Deadwood, but that the latter was the less promising of the two. Total depth is 4,672 ft. and the 5½-in. was cemented at 4,619 ft. It is said that the Embar and Tensleep, the normal producing sections in the field were not well defined in the well. This is the first exploratory well to go below the Madison and is rated as an unusually important test as it will have a bearing on the other Embar-Tensleep fields in the basin.

COLORADO WILDCAT COMPLETION

Red Mesa, La Platte County: Ashback & Locke 1 Hrueger, CEL SW NE 34-33n-12w, dry in Mancos shale, TD 3,005 ft.

WYOMING WILDCAT COMPLETION

East Lance Creek, Niobrara County: Continental Oil Co. 1 Wright, NW SW NW 25-36n-64w, TD 4,100 ft.; water in Lakota at 3,967-4,072 ft., plugged back to lower Dakota and perforated with 29 shots at 3,847-67 ft., flowed 184 bbl. in 8 hours of 42.3-gravity oil.

MONTANA WILDCAT COMPLETIONS

Willshaw Block, Toole County: The Texas Co. 1 Wagner, NE SW NE 20-36n-1w, TD 2,006 ft., plugged back to Sunburst, shot 90 qt. at 1,756-81 ft., after pumping off made 7½ bbl. in 22 hours.

Fulcher basin, San Juan County: Roland R. Wooley 7 Government, NW SW NW 34-30n-11w, dry in Picture Cliff sand, TD 2,452 ft.

Red Mountain, McKinley County: Neposuta, Inc. 1 Red Mountain, NE SW SE 20-20n-9w, dry at 501 ft.

CALIFORNIA

Wildcat Mortality Is Exceptionally High

LOS ANGELES.—Wildcat mortality was exceptionally high during the past week, eight having been listed for abandonment. The latest wildcat scheduled for abandonment is that of Seaboard Oil Co. in Elysian Park which was listed as having hit basement rocks at 1,771 ft. This test was located outside the park property but was to be bottomed beneath the park property by directional drilling. A similar wildcat in the Salt Lake field of Los Angeles, drilled by Shell Oil, Inc., also proved a failure.

Barnsdall Oil Co. is preparing to start a deep test in the Newhall Potrero field of Los Angeles County in a field where deeper production possibilities are outstanding. In the Long Beach field, Shell will soon start a deep test but if the De Soto zone at approximately 10,000 ft. shows promise the well may be completed in that horizon. Union Oil Co.'s deep test in the Montebello extension has been delayed by mechanical trouble for the past 10 days at 10,690 ft.

In Madera County, Union has been drilling a series of shallow core holes over an extensive area involving approximately 20,000 acres and will drill a new wildcat in that district if markers reveal possible existence of a structure. A discovery in this region would probably be gas rather than oil. Capital Co. has taken a lease on the McGrath property in the Seal Beach field and expects soon to drill a deep test east of the fault. Continental Oil Co. retains its 15 wells producting on this property and will also retain all rights to the zones now producing. A new wildcat is also scheduled for early start southwest of the Inglewood field in Los Angeles basin.

Superior Oil Co. which discovered a new field recently in the Bellevue district of Kern County, has apparently missed the lower zone which was found in the discovery well but did find the upper Stevens zone and will probably plug back for completion in the upper Miocene sand. Tide Water Associated Oil Co., however, has cemented its second well in the Mountain View field on top of the pay and will be tanking oil within another few days. The discovery well in this accumulation against a fault died last week and has been placed on the beam. In the Fillmore district of Ventura County, Standard Oil Co. of California has encountered mechanical trouble in 2-1 Fillmore Community which was down 14,512 ft. at the time drill pipe stuck and a redrilled hole went back into the original hole.

The next fortnight should witness the completion of several additional wells in the Buena Vista field. To date four good wells have been completed and over 640 acres have been proved up as productive. Plans are being formulated for an early start of development work in the Elk Hills Naval Reserve by Standard and the Navy Department. The objective is to increase production of crude oil to 65,000 bbl. daily which on the basis of 250 wells means that engineers estimate each new well should be good for an average of 200 bbl. daily. There is much undrilled acreage in the reserve.

CALIFORNIA WILDCAT COMPLETIONS

Antioch wildcat district, Contra Costa County: Shell 1 Heidorn, 4-1n-2e, dry in gray sand, form. test 3,690-735 ft. recovered 850 ft. mud, no oil or gas, TD 4,048 ft.

Belridge wildcat (outpost) district, Kern County: C.C.M.O. Co. 14-2 Belridge fee, 14-29s-21e, dry in sandy blue shale, no oil or gas showings found, TD 4,475 ft.

Colusa wildcat district, Colusa County: Union and General Petroleum 1 Azro, 10-16n-1w, dry in Cretaceous shale, form. test 1,749-83 ft. recovered 280 ft. mud and water, no oil or gas, TD 3,018 ft.

Cymric wildcat (outpost) district, Kern County: D. D. Dunlap 1 Noel, 20-29-21e, dry in gray sand, no oil or gas showings logged, tar sand was absent, TD 3,233 ft.

Edison wildcat (outpost) district, Kern County: F. G. Walker 1 Edi-Rito, 12-30-29e, dry in gray sand, form. test 1,482-1,708 ft. recovered 110 ft. mud, no oil or gas, top Santa Margarita 1,485 ft., TD 1,708 ft.

Earlimart wildcat district, Tulare County: Barnsdall 1 Lombardi-Security, 16-23s-26e, dry in basement slate, TD 4,223 ft.

Gosford wildcat district, Kern County: Continental 1-J Kern County Land, 17-30s-27e, dry in gray sand, TD 9,303 ft.

Westminster wildcat district, Orange County: R. S. Lytle 1 Green Wing, 15-5s-11w, dry in gray sand, was running extremely low structurally, TD 4,561 ft.

MICHIGAN

Nine Oil Producers and One Gas Well Developed

SAGINAW.—Nine oil producers and a gas well were developed in the past week, their original daily yield ranging from 5 to 220 bbl. Of the completions only three were dry holes, including one wildcat test. Chief attention given new producers centers on the Sun Oil Co. 9 Horner trustee, in Norwich Township, Missaukee County, which flowed 96 bbl. in 19 hours after being plugged back to 4,506 ft. from 4,594 ft. and acid treated.

New drilling permits for 14 locations were issued by the state conservation department. The 1944 total increased to 296 as two permits each were issued for Allegan, Arenac and Bay counties, one each for Cass, Clare, Ogemaw, Osceola, Ionia, Montcalm, Muskegon and Van Buren counties.

MICHIGAN WILDCAT OPERATIONS

Kalamazoo County, Oshtemo Township: Fisher-McCall Oil & Gas, Inc. 1-B Henry Bishop, SW NW NE 5-2s-12w, dry in Traverse limestone, TD 1,392 ft.

OKLAHOMA

Operators Watching Three Important Developments

OKLAHOMA operators had three important developments to watch this week, all within a 25-mile radius of Oklahoma City. Jordan Petroleum Co. 1 Williams, SW SE SW 11-14n-1w, opened a new pool, Arcadia, N. E., when it flowed 48 bbl. per hour for 22 hours from second Wilcox sand at 5,980-97 ft. Phillips Petroleum Co. extended the West Edmond field 1 mile northeast when its 1 Gomer Smith, SW NW 16-14n-6w, found 70 ft. of saturated Bois d'Arc section of the Hunton. Mid-Continent Petroleum Corp. 1 Westermeier, NE SW SW 26-10n-3w, was preparing to perforate and test its prospective new pool opener, which has been tentatively named South Moore.

The new Arcadia pool is the result of the third test drilled by Jordan Petroleum on a block of about 7,000 acres. The first well, 1 Bourne A, SE NE 14-14n-1w, made a small producer in the first Wilcox. The second well, 1 Bourne C, NE SE 14-14n-1w, was dry at 5,877 ft. The third well, the Williams, set casing at 5,977 ft., then drilled plug. In the first 2 hours it flowed 130 bbl. of 39°-gravity oil through a ½-in. tubing choke, and was allowed to flow until storage was filled.

Mid-Continent prepared to test its Westermeier discovery, after setting pipe at 8,892 ft., with reports indicating second Wilcox was topped at 8,835 ft. While officially reported to be on a separate structure from the West Moore pool, 2½ miles west, interest is still running high in the ultimate disposition of the 500-odd acres in 28-10n-3w, between the West Moore pool and the Westermeier test, originally acquired by the Navy as an emergency aviation landing field. Congress has refused to pass a bill to sell the land back to original land owners, and it is not known how it will be disposed of.

The Phillips well, extending West Edmond a mile northeast, assures that company, according to official statements, of 40 additional proven locations in the north end of the field. The L. A. Chudakoff 1 McClain, NW SW 19-14n-4w, 1¼ miles south

DAILY AVERAGE PRODUCTION FOR WEEK

	June 24 crude oil	Distillate, allied products	June PAW quota all oils	June 17 crude oil
Arkansas	80,180	5,000	83,000	80,250
California	847,750	48,200	897,400	850,150
Colorado	7,650	.....	7,400	8,350
Eastern	69,300	8,600	82,200	69,100
Illinois	209,250	13,500	233,500	205,150
Indiana	12,300	.....	14,000	12,400
Kansas	289,700	5,800	279,800	284,200
Kentucky	20,800	2,700	25,700	20,600
Louisiana	362,940	45,000	395,000	362,650
North Louisiana	74,190	.....	.....	73,900
South Louisiana	288,750	.....	.....	288,750
Michigan	47,200	300	51,300	50,200
Mississippi	45,200	.....	42,000	42,900
Montana	23,050	300	24,700	23,050
Nebraska	1,000	.....	1,000	1,000
New Mexico	108,100	4,900	117,900	108,000
Oklahoma	332,300	28,000	360,000	331,850
Texas	2,036,400	132,000	2,163,000	2,036,500
East Texas	360,550	.....	.....	360,900
East Central Texas	145,000	.....	.....	145,000
North Central Texas	149,400	.....	.....	149,500
Texas Panhandle	92,150	.....	.....	92,100
West Texas	447,900	.....	.....	447,900
South Central (San Antonio)	19,650	.....	.....	19,550
South Texas (Laredo)	77,500	.....	.....	77,500
Lower Gulf Coast	215,800	.....	.....	215,800
Upper Gulf Coast	528,450	.....	.....	528,450
Wyoming	91,250	7,200	101,200	82,550
Total United States	2,584,370	301,500	4,879,100	4,568,900
Total production January 1-June 24, 1944				782,229,451 bbl.
Same period last year				685,344,830 bbl.

and 2 miles west of the Phillips well, flowed 775 bbl. in 4 hours after acidizing. Fox & Fox 2 Peterson, SE SW 19-14n-4w, flowed 200 bbl. in first hour on test. Peppers Refining Co. completed 1 Flynn, SW SW 33-14n4w, and 2 French, SE NW 33-14n-4w, and 1 Winters, SW NE 19-14n-4w.

All of these developments intensify the shortage of heavy drilling rigs, which is holding up the drilling of many proven locations in Oklahoma.

OKLAHOMA WILDCAT COMPLETIONS

Carter County: Pure Oil 1 Dillard estate, NW NE SE 6-3s-2e, dry, TD 10,017 ft., Viola 6,507 ft., McLish 8,399 ft., Oil Creek 8,451 ft., Arbuckle 9,485 ft.

Lincoln County: H. F. Wilcox and Magnolia 1 Sparks, SE NE SW 21-13n-5e, dry, TD 5,190 ft., First Wilcox 5,108 ft., Second Wilcox 5,141 ft.

Flynn et al 1 Kinsey, NE NW NW 22-12n-4e, dry, TD 5,557 ft., First Wilcox 5,478 ft., second Wilcox 5,543 ft.

APPALACHIAN FIELDS

Allegheny County Well Showing Gas and Oil

PITTSBURGH.—Near Elizabeth in Allegheny County, Pennsylvania, Wasson & Co. completing a second well on the Florence Bedsworth farm topped the Hundred-foot sand at 2,159 ft. and at 2,173 ft. had a gas pay gaging 213,000 cu. ft. At 2,200 ft. some oil was struck. The hole was deepened to 2,215 ft. with several bailers of oil being recovered. Oil is estimated at 10 to 12 bbl. a day.

In Morris Township, Washington County, Pennsylvania, Lewis & Pettit completed a gas well on the W. S. Shriver farm in the Injun sand topped at 1,813 ft. and it gaged 3,000,000 cu. ft. at 1,945 ft.

In West Virginia, Hope Natural Gas Co. completed 8888 Louis M. Bennett, Center district, in the Injun sand, total depth 2,390 ft., and it gaged 3,499,000 cu. ft. of gas and about 30 bbl. of oil a day.

In Tucker County, Ohio Oil Co. recovered drill pipe lost at 8,038 ft. in the Kaemmerling rotary test, Dry Fork district, which is 60 ft. in the Oriskany sand. Operators are trying to reach bottom but are impeded by trouble in the casing window at 7,480 ft. No drill-stem test has been made of the gas.

ILLINOIS

32 New Wells Include Two Extensions and Pool Opener

CENTRALIA.—Pure Oil Co. extended the Clay City Consolidated pool at least a mile with 1 R. E. Thompson, NW NW NW 26-2n-7e, Wayne County. Producing from acidized McClosky lime at 3,026-80 ft., at intervals, it first swabbed and flowed 278 bbl. in 24 hours after a light acid treatment. A heavier dose of acid increased the output to 427 bbl. per day, pumping and flowing, with an accompaniment of 37 bbl. of water.

Forty-five wells were completed in Illinois during the week, 32 oil wells and 13 dry holes. Thirty-five new operations were started.

The largest new well of the week was Pure Oil Co. 1 McKenzie, NE SW SW 23-1n-8e, in the big Clay City Consolidated field, which pumped and flowed 581 bbl. from acidized McClosky lime at 3,037-48 ft., total depth 3,076 ft.

Nash Redwine, George Boyce et al 1 G. C. Jones, SE NW NE 31-1n-10e, Edwards County, 7 miles northwest of Albion, opened a pool in Shelby Township. McClosky lime was found at 3,238-45 ft., TD 3,247 ft. It swabbed at the rate of 500 bbl. per day, without an acid treatment. The well had not yet been completed.

Five miles southwest of Newton, Schuller & Witt 1 Mary S. Lourance, a wildcat, NE SW NE 3-5n-9e, Jasper County, 2½ miles west of the Dundas Consolidated pool, swabbed 97 bbl. in 8 hours, following an acid treatment of McClosky lime at 3,054-60 ft.

New wildcat operations listed during the week include Ryan 1 Glover Mills, NE SE SW 21-7s-9e, and Burr Lambert 1 H. W. Burkhart, NE NE SW 16-5s-9e, White County; M. C. Freeman 1 L. Seneff, NW NE SW 20-1n-9e, Wayne County; Robinson & Puckett 1 Otto Heath, NW NE NW 3-3n-13w, and Parriott & Sprowls 1 L. A. Funk, C NW NE 25-4n-11w, Lawrence County; Lynn E. Ross 1 Daly, NW NW SW 35-11n-14w, a Trenton lime test, Clark County.

ILLINOIS WILDCAT COMPLETIONS

Ford County: (Delayed record of formation tops on well junked at 2,237 ft., Dec. 21, 1943). Herndon Drilling Co. 1 Fecht, SE SE SW 33-26n-9e, base of Pennsylvanian 285 ft., Silurian top 304 ft., Maquoketa 840 ft., Galena 1,035 ft., Decorah 1,205 ft., St. Peter 1,450 ft., Shakopee 1,690 ft., New Richmond 2,000 ft., Oneada 2,075 ft.

Kendall County: (Delayed report on formation tops in well completed Feb. 22, 1944, junked in Mount Simeon formation at 2,328 ft.) Herndon Drilling Co. 1 R. Proctor, NE NE SE 36-36n-8e, top of Silurian 104 ft., Maquoketa 200 ft., Galena-Plattville 295 ft., St. Peter 585 ft., Trempeleau 1,090 ft., Ironton 1,205 ft., Galesville 1,415 ft., Eau Claire 1,512 ft., Fon du Lac 1,920 ft.

Edwards County: A. F. Dye and Ashland

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O. & R. 1 N. O. Bettbennet, NE NE NE 18-1n-14w, dry at 3,180 ft., Menard 2,279 ft., Cypress 2,751 ft., Benoist 2,829 ft., Aux Vases 3,000 ft., Fredonia 3,096 ft.

Sinclair-Wyoming 1 F. S. Racster, SW SW SE 18-1s-14w, dry at 3,191 ft., Biehl sand 1,425 ft., Cypress 2,733 ft., Benoist 2,885 ft., Aux Vases 3,014 ft., McClosky 3,078 ft., St. Louis 3,138 ft.

Jefferson County: A. A. Cameron et al 1 Olive Watkins, NW SE NE 24-2s-1e, dry at 2,422 ft., Menard 1,462 ft., Cypress 1,914 ft., Benoist 2,071 ft., Roseclaire 2,240 ft., sand 2,296 ft.

Richland County: Smokey Oil 1 L. W. Winters, NE NW SE 30-3n-11e, dry at 3,340 ft., Glen Dean 2,687 ft., Cypress 2,869 ft., Benoist 3,094 ft., Ste. Genevieve 3,214 ft., no McClosky, St. Louis 3,335 ft.

Schuyler County: Hamberg and Miller 1 Taylor, SE NE NE 30-1n-1w, of fourth principal meridian, dry at 630 ft.

Wabash County: S. J. Tucker 1 Wright, SW NW SE 20-1s-13w, dry at 2,917 ft., Glen Dean 2,248 ft., Cypress 2,528 ft., Paint Creek 2,612 ft., Ste. Genevieve 2,786 ft., no McClosky.

Ashland & Martin 1 Ed Crumb, NW NE NW 1-1n-14w, dry at 2,989 ft., Menard 2,071 ft., Barlow 2,531 ft., Ste. Genevieve 2,845 ft., no McClosky.

Wayne County: Pure Oil 1 R. E. Thompson, NW NW NW 26-2n-7e, McClosky lime at 3,026-34 ft., 3,048-56 ft., 3,062-72 ft., 3,075-80 ft., TD 3,082 ft., acidized and reacidized, pumped and flowed 427 bbl. of oil and 38 bbl. of water. Extends Clay City pool.

Texas 1 A. H. Watts, SE SE NW 15-3s-6e, dry at 3,515 ft., upper Glen Dean 2,715 ft., Paint Creek 3,148 ft., Aux Vases 3,284 ft., McClosky 3,422 ft., St. Louis 3,510 ft.

Pure 1 E. W. Trotter, SW SW SE 17-1n-8e, dry at 3,150 ft., Clore 2,078 ft., Cypress 2,711 ft., Bethel 2,898 ft., Aux Vases 2,962 ft., Fredonia 3,068 ft.

KANSAS

New Pools for Ellsworth And Sheridan Counties

KANSAS operators finished 42 wells last week, 25 oil wells, 2 gas wells and 15 dry holes, opening two new pools in the process, the Vacek pool in Ellsworth County and the Adell pool in Sheridan County. In addition to these two successful wildcats there were 7 dry wildcats completed, leaving the score for field completions at 23 oil wells, 2 gas wells and 8 dry holes. New operations started totaled 44, of which 13 were new wildcat locations.

Cities Service Oil Co. 1 Vacek, NE NE SW 32-15-10w, was completed in the Arbuckle for 108 bbl. potential, pay zone 3,316-20 ft., after getting top of reworked Arbuckle at 3,315 ft. The new Ellsworth County pool was named Vacek and lies north of the Stoltenberg and east of the Chegwidden pools.

Continental Oil Co. 1-C Cramer, NW NW NE 11-6-27w, discovery well of the Adell pool, was given a potential of 840 bbl. of 41.5° gravity, from the Lansing pay zone at 3,752-62 ft. This well was drilled to a total depth of 4,047 ft., topped granite wash at 4,012 ft., and was plugged back to the discovery pay. The Adell pool marks a new northwest extension of the Central Kansas uplift string of pools. It is in Sheridan County about 10 miles northwest of the Studley pool, the nearest production.

Among the field well completions, three were given top potential of 3,000 bbl., one each in the Ellis County Riverview pool, the Graham County Morel pool and the Rooks County Barry pool. Ellis County's Beeching pool also had a 1,000-bbl. potential completion. Pratt County's Chitwood pool had two rated at slightly over 1,000 bbl.; Rice County's Chase pool had one rated at 1,410 bbl., and Stafford County's McCandless pool had one rated at 1,322 bbl. potential.

KANSAS WILDCAT COMPLETIONS

Douglas County: Skelly Oil 1 Middlekauf, SW NE NE 21-13-19e, dry, TD 1,855 ft., Arbuckle 1,842 ft.

Ellis County: Tom Allen et al 1 Braun, SE SE SE 1-13-17w, dry, TD 3,609 ft., Arbuckle 3,570 ft.

Ellsworth County: Cities Service 1 Vacek, NE NE SW 32-15-10w, 108 bbl. per day, pay zone 3,316-20 ft., TD 3,320 ft., top reworked Arbuckle 3,315 ft. Vacek pool discovery.

Graham County: Phillips Petroleum 1 Knoll, NE NE NE 14-10-25w, dry, TD 4,577 ft., Arbuckle 4,520 ft.

Leavenworth County: McLaughlin et al 1 Lee, NE SE 35-9-20e, dry, TD 1,550 ft., Mississippi Lime 1,388 ft.

Rice County: J. H. Hershey 1 Major, NW NW SE 3-19-7w, dry, TD 3,615 ft., Arbuckle 3,587 ft.

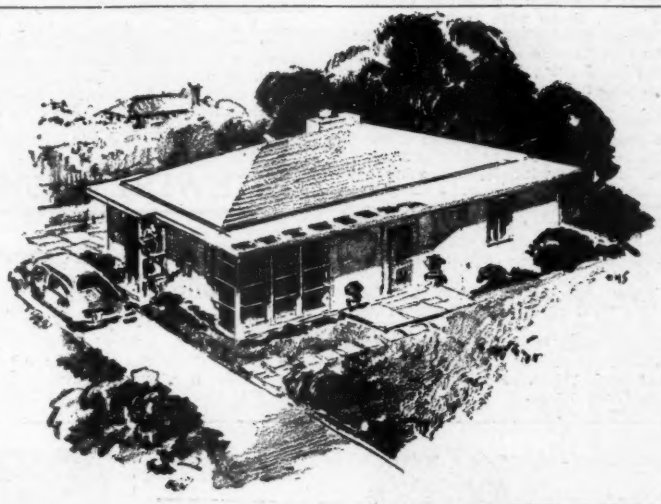
Stanolind Oil & Gas 1 Davis, SE SE SE 33-19-7w, dry, TD 3,683 ft., Arbuckle 3,669 ft.

Sheridan County: Continental Oil 1 Cramer NW NW NE 11-6-27w, 840 bbl. 41.5-gravity oil per day, Lansing pay zone 3,752-62 ft., TD 4,047 ft., Kansas City 3,630 granite wash 4,012 ft. Adell pool discovery.

Stafford County: Stanolind Oil & Gas et al 1 Gobin, NW NE SE 33-25-13w, dry, TD 4,382 ft., Arbuckle 4,346 ft.

FOREST CITY BASIN

ST. JOSEPH, Mo.—Skelly Oil Co. 1 Middlekauff in SW NE NE 21-13s-9e, Douglas County, Kansas, a wildcat test, was a dry hole at total depth of 1,855 ft. The base of the Kansas City lime was at 483 ft.



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top of Mississippi at 1,263 ft., base of Mississippi at 1,539 ft., top of Hunton at 1,596 ft., and top of the Arbuckle at 1,824 ft.

McLaughlin et al 1 Lee in C NE SE 35-9s-20e, Leavenworth County, Kansas, was a dry hole. Mississippi lime was topped at 1,388 ft. The 6-in. pipe was set at 1,396 ft., but there was a hole full of water from 1,548 to 1,558 ft.

TEXAS GULF COAST

Hull Field Gets New Pay Zone

HOUSTON.—A new sand has been discovered in the Hull field, Liberty County, by John W. Mecom 1 Abshier et al unit, and the well has been dual completed from perforations at 6,810-40 ft., potential 187 bbl. daily on ¼-in. choke with casing pressure 600 lb., gas-oil ratio 800:1, gravity 36.4°, no water, and from perforations at 6,940-70 ft., with potential flowing 531 bbl. daily on ½-in. choke, gas-oil ratio 676:1, gravity 36.7°, no water.

Seabreeze field in Chambers County has been extended to the east by Sun Oil Co. 1 Thompson, T&NO Survey 133, at a total depth of 9,929 ft., with 5½-in. casing set at 9,925 ft., perforated from 9,450-75 ft., initial production 769 bbl. of condensate and 20,500,000 cu. ft. gas daily open flow, gas-oil ratio 25,655:1, tubing pressure 2,550 lb. flowing, casing pressure 3,000 lb. shut in, gravity 53.1°.

Tide Water Associated Oil Co. 1 Harding, on the west side of Old Ocean field, Matagorda County, is now testing in perforations from 10,069-71 ft. after setting tubing. Drill-stem test had recovered 600 ft. of gas-cut mud, 125 ft. of pipe-line oil and 200 ft. of fresh water.

UPPER TEXAS GULF COAST WILDCAT COMPLETIONS

Colorado County: Sinclair Prairie Oil Co. 1 C. G. Glasscock, Louis Henry Sur., 4 mi. N of Rock Island, dry at 11,015 ft.

Harris County: Humble Oil & Refg. Co. 1 Maud Hickman, Ned Delhi area, H&TC Sur., dry at 7,760 ft.

Jackson County: Akron Production Co. 2 Joseph Wearden, I&GN Sur. 2, Blk. 4, 4 mi. N of Cordele field, total depth 4,828 ft., perforated 4,826-36, PT 2,000,000 cu. ft. gas daily ½-in. choke, tubing pressure 1,500 lb., casing pressure 1,700 lb., Gas discovery.

Jackson County: Butcher-Arthur, Inc. 1 Andrew Lorenzen, J. J. Linn Sur., 4 mi. NW of Texana field, total depth 6,812 ft., perforated 5,820-30, PT estimated 600,000 cu. ft. gas daily, 7/8-in. choke, spray straw-colored condensate, tubing pressure and casing pressure 2,450 lb. Gas discovery.

Jackson County: Rixie Wright 1 Henrietta Huseman, East Mauritz discovery, Sur. 15, 2 mi. NW of Mauritz field, just a few feet southwest of Wharton County line, total depth 5,720 ft., perforated with 24 shots from 5,662-68 ft., PT 52.44 bbl. daily 3/32-in. choke, gas-oil ratio 992:1, tubing pressure 600 lb., casing pressure 1,500 lb., gravity 30.6, no water.

SOUTHWEST TEXAS

New Gas Field Discovery For Zavalla County

CORPUS CHRISTI.—The Texas Co. has completed its wildcat, 1 William Van Cleve in Van Cleve Survey 8, Zavala County, 12½ miles northwest of Crystal City, as a gas well from perforations at 1,980-65 ft. The well has not been gaged. Total depth is 2,538 ft., with 5½-in. casing at 2,044 ft. Previous test at 1,930-34 ft. had recovered salt water.

North extension to Willamar field, Willacy County, Humble Oil & Refining Co. 2 Sauz Ranch, on Share 13, S. J. de Carricitos grant, drilled to total depth of 8,025 ft., ran log, and operators now are reaming to set casing.

Northern Ordnance, Inc., 1 Schaeffer, in W. J. Eaton Survey, Mission Valley area, Victoria County, is coring ahead around 8,587 ft. It is reported this well cored a sand showing gas at 8,425 ft.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

Duval County: M. M. Miller & Sons 1 Atlee Parr, 10 mi. SE of Benavides, in San Andres Grant, Abst. 657. Dry at 5,788 ft.

G. B. Parr 1 Jesus G. Ancira, J. Poitevent Survey, 3 mi. NE of Benavides, dry at 4,703 ft.

Goliad County: Continental Oil Co. 1 S. H. Reed, South Cabeza Creek discovery, in Sebastiamo Vela Survey, 11,500 ft. S-SE of Cabeza Creek-Wilcox discovery, total depth 9,019 ft., perforations 48 from 8,806-16 ft., PT 73 bbl. daily ¼-in. choke, gas-oil ratio 47,000:1, tubing pressure 2,735 lb., no water.

Jim Hogg County: Bridwell Oil Co. & Midstates Oil Co. 1 Clara Yeager, gdn., Neriecitas Grant, 2 mi. SW of Hebbronville, dry at 3,981 ft.

Jim Wells County: Bridwell Oil Co. 1 E. A. Ranz, Seeligson Ranch, Section 25, 1½ mi. SW of Premont, dry at 7,298 ft.

Karnes County: Charles E. Fraser, Inc. 1 E. P. Ruhman, Willis Orton Survey 135, 3½ mi. SW of Hobson field, dry at 4,315 ft.

Sohio Petroleum Co. 1 Mrs. S. E. Radford, Moses Nichols Survey, 2½ mi. SE of Hondo Creek field discovery, dry at 8,031 ft.

San Patricio County: Great Lakes Carbon

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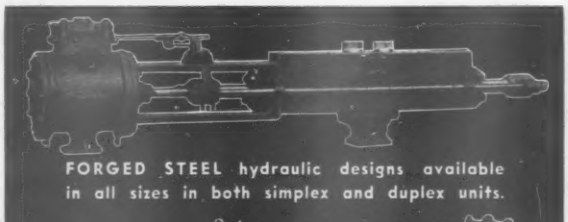

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Corp. 1 C. A. Maedgen, Delgado Grant, 2 mi. S of Mathis, dry at 5,045 ft.

Victoria County: Northern Ordnance Co. 1 W. F. Heath, Mission Valley discovery, Eben Haven Survey, Abstract 58, 1 mi. N of Mission Valley townsite, total depth 10,014 ft., perforated with 20 shots from 8,402-07 ft., PT 120 bbl. daily through 7/64-in. choke, gas-oil ratio 40,000:1, tubing pressure 1,750 lb. flowing, 3,150 lb. shut in, gravity 51.5, no water.

SOUTH LOUISIANA

New Pay Prospect For Cankton Field

NEW ORLEANS.—A new pay prospect for the Cankton field, St. Landry Parish, Sun Oil Co. 1 Laurent Patin, in 48-8s-4e, located south of the discovery well, is drilling at 9,617 ft. in hard shale, which is considerably below the depth from which the discovery is producing.

In the College Point area, St. James Parish, Humble Oil & Refining Co. 1 Mrs. Ross Roussell Keller et al, in 31-12s-4e, shows top of cement at 10,802 ft. and operators are preparing to perforate for second production test. Total depth is 10,893 ft. with 7-in. casing set on bottom. On first test, well is reported to have flowed approximately 4 bbl. hourly from perforations at 10,658-68 ft.

N. CENTRAL TEXAS

Clay County Wildcat Showing Ordovician Oil

WICHITA FALLS.—Continental Oil Co. and Edge Oil Co. 1 Crockett, wildcat in Section 3,245, TE&L Survey, 1 mile east of Buffalo Springs and 5 miles south of Stephens pool, promised to produce from Ordovician dolomite topped at 6,487 ft. On 1-hour drill-stem test the prospective pool opener recovered 450 ft. of 44-gravity oil, zone tested being from 6,489-6,523 ft. Bottom of the hole is 6,558 ft., and it is likely the formation will be treated with acid. Whether this zone is Simpson or Ellenburger dolomite has not yet been decided.

Montague County.—Final gage on the new discovery 2 miles northeast of Denver, Sinclair Prairie Oil Co. 1 W. M. Templeton, Edward Wingate Survey, was 103.56 bbl. of 38-gravity oil per day, from Caddo lime 6,056-59 ft. The well was drilled to total depth 6,330 ft., passing top of Marble Falls at 6,228 ft., and was plugged back and perforated.

Archer County.—Consolidated Oil Co. 1 Garrett, J. Walker Survey, was completed flowing 112 bbl. per day through 18/64-in. choke, from Strawn sand pay at 3,780-3,800 ft.

Jack County.—A new wildcat, to test Ellenburger possibilities, is Continental 1 William L. Risch, Lot 13, Block 2, Henderson County School Land Survey, 5 miles north of Gibtown.

Grayson County.—Pure Oil 1-A Quintin Little, J. Meyer Survey, midway between Gordonville and Sandusky, is to be an 11,000-ft. rotary test, with operations to begin immediately. In Collin County, Pure Oil is drilling a stratigraphic test 1 mile northeast of Celina, on the Finley farm in Martha Herron Survey. The test had progressed near 2,500 ft.

Cooke County.—Near the old Big Indian Development Co. 1 Davis, which has been producting for several years with dry holes offsetting, Sinclair Prairie has staked its 1 Kitcherns in Lot 9, Fannin County School Land, 6,000-ft. test 1¼ miles southeast of Callisville.

CANADIAN FIELDS

Extension Indicated for South Turner Valley

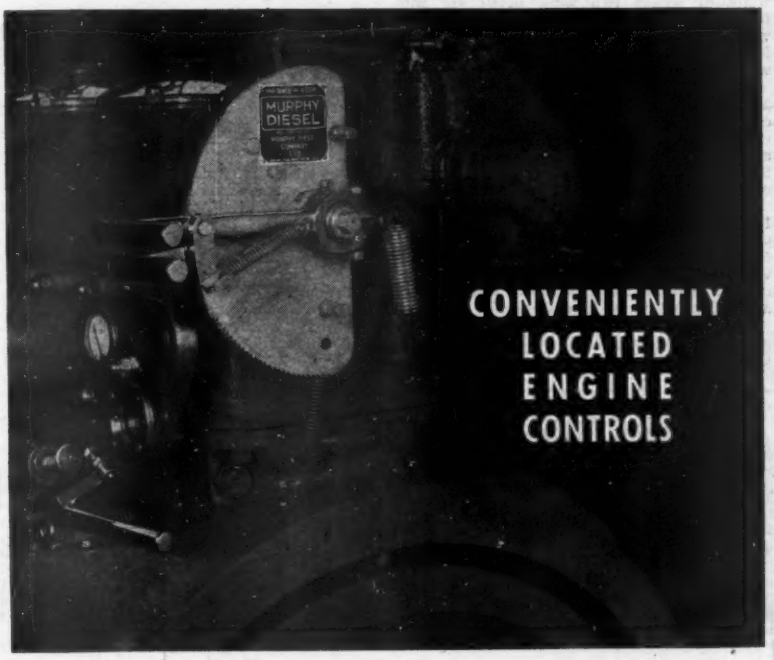
CHATHAM.—Prospects of an important extension of the South Turner Valley producing area are indicated by two outpost wells now drilling. Imperial-Turner Valley 1, LSD 5, 9-18-2w5, south and east of the producing area, is below 7,179 ft. after getting the Madison at 7,102 ft. and Major-National 16, LSD 4, immediately south, is in Home sand at 7,100 ft.

Conrad.—In the Conrad area, southwest of the Taber field, California-Standard 2, LSD 1, 5-6-15w4, bottoming at 2,979 ft., has good oil shows on drill-stem tests at 2,968 ft.

Twin River. — In the Twin River area, south of Lethbridge, Pacific Oil 2, LSD 13, 2-2-20w4, bottoming in Madison lime at 3,927 ft., has pumping production of slightly less than 100 bbl. of 32.6° crude. Production is trucked to the company's refinery at Lethbridge.

Taber.—Mid-Continent Oil & Gas 3, LSD 13, 1-8-17w4, south and west of the original Taber development, has been pumping 60 to 70 bbl. in 8-hour periods, with 80 per cent oil and 20 per cent drilling fluid.

Gaspe.—In the Gaspe Peninsula, Quebec province, C.P.L. 2 is setting 8⅝-in. casing at 1,411 ft. Drilling and coring will continue from 1,955 ft. carrying 8-in. hole to the oil horizon.



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LA.-ARK.

Mount Holly Townsite Test Ready to Perforate

MAGNOLIA, Ark.—Attention of operators in this area is focused on the Carter Oil Co. 1 Wilson, Mount Holly townsite wildcat, SW NW 33-16s-18w, 2 miles north of the Mount Holly pool. Derrick repairs have been completed and preparations are being made to perforate casing for a test. The cores and electric log survey showed 65 ft. of saturated porosity in the Smackover lime from 6,939-7,004 ft.

There were three completions in Arkansas last week, including one producer in the Mount Holly pool and one producer and a dry hole in the Haynesville Extension pool. North Louisiana operators completed eight wells, of which two were producers and four were dry. However, at the end of the week, Arkansas operators were completing five new producers and North Louisiana was getting three good wells.

Columbia County.—Midstates Oil 1 Partee, 276 ft. south and 1,980 ft. east of the NW cor. 3-20s-20w, Haynesville Extension, was completed for 712 bbl. from the Pettit pay at 5,489-96 ft. Same company's 1 Beene-Dreyfuss, 1,236 ft. north and 510 ft. east of the C 2-20s-20w, was dry at 6,002 ft.

At the week end, Atlantic Refining Co. 1 McWilliams unit, in 18-18-21, Macedonia pool, was being completed in the lime, after failing to get production in the Cotton Valley; While Lion Oil & Refining B-1 Dickens, in 16-18-22, Dorcheat area, was making a successful dual completion.

Ouachita County.—The Stephens pool was getting two producers, as Grady Vaughan C-2 Smart in 2-15-20 and Vaughan and Talco 1 Ethan Allen, in 13-15-20 were preparing to complete.

Union County.—Atlantic Refining Co. completed its 1 Church unit, 651 ft. west and 657 ft. north of SE cor. NW NE 15-17-18, Mount Holly pool, for 144 bbl. from pay zone at 7,171-73 ft.

NORTHERN LOUISIANA WILDCAT COMPLETIONS

La Salle Parish: Placid Oil 121 Louisiana Central, NE 25-10n-2e, dry, TD 8,320 ft.
Ouachita Parish: Kingwood Oil 1 Pardee, NE SW 10-16n-3e, dry, TD 6,363 ft.

PERMIAN BASIN

Gaines County Wildcat Showing for Well

MIDLAND.—Stanolind Oil & Gas Co. 1 T. S. Riley, Section 79, Block H, D&W Survey, 7 miles west by south of Cedar Lake pool, total depth 5,176 ft., indicated a new Permian field for eastern Gaines County on drill-stem test and casing was being cemented for production test. On drill-stem test at 5,060-5,137 ft., this wildcat showed 1,170 ft. fluid in the hole on 2-hour test, 450 ft. of which was oil. The new prospect is 8½ miles northeast of Honolulu 1 Homan gasser, and is 4½ miles southeast of a dry hole which had some shows of oil in the same pay. Continental Oil Co. 1 Jones, Section 22, Block A-7, Public School Land Survey, northwest Gaines County wildcat which was a failure at total depth 12,222 ft., acidized 8,000 gal. through casing perforations at 7,455-91 ft., opposite Clear Fork formation, and swabbed 1 bbl. per hour for 10 hours. Potential gage of 465 bbl. per day was registered at Shell Oil Co., Inc. 1 Jones, Section 490, Block G, CCSD & RGNG Ry. Survey, ¾ mile south extension to Russell pool, which is bottomed at 7,600 ft. North and east offsets have been staked to the new producer.

Winkler County.—The Keystone-Holt pool has been extended southeast for a distance of 1½ miles at Falcon Co. 5 McCutcheon, Section 15, Block B-2, Public School Land Survey, which is an old well drilled deeper from the Keystone lime pay. This well was drilled to total depth 4,872 ft., and perforated casing with 20 shots from 4,740-45 ft., and flowed 275 bbl. per day through ¾-in. choke, showing from 10 to 20 per cent b.s. and w. Sinclair Prairie Oil Co. 1 Seth Campbell, Section 11, Block B-5, Public School Land Survey, total depth 12,305 ft., which topped Ellenburger at 12,045 ft., cemented 5½-in. casing at 12,250 ft., and will perforate and test several zones. This wildcat was considerably lower on top of Ellenburger than producers in Keystone-Ellenburger and Kermit-Ellenburger pools.

Cochran County.—Helmerich & Payne 1 Della Slaughter Wright, Labor 19, League 97, Brewster County School Land, total depth 4,925 ft., swabbed free oil after acidizing with 5,000 gal. It is 2½ miles southwest of the new San Andres 1 Clouser discovery, and the same distance northwest of the Sunray-Wright area.

Four wildcats, two of which are scheduled to test the Ellenburger, have been staked in the district. In Pecos County, 1½ miles southwest of Abell pool production, Magnolia Petroleum Co. 1 Hart-State was staked in W¼ W¼ Section 8, Block 3, H&TC Ry. Survey, to test Ellenburger at 6,500 ft. Magnolia also staked an Ellenburger test in Mitchell County, on the east edge of the Iatan-East Howard pool. It is its 22 Mary Foster, SE NW Section 17, Block 29-1s, T&P Ry. Survey. In Andrews County, 1½ miles southeast of Fuhlman pool pro-

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duction, Continental Oil Co. et al have staked a 7,500-ft. Clear Fork lime test at 1 University, SE SE Section 5, Block 9, University Survey. Andrews County also received a new upper Permian lime test at Stanolind 1-J University, NE SE Section 32, Block 41-2n, G&MMB&A Survey, 3½ miles east of its 1-F discovery.

SOUTHEAST NEW MEXICO

HOBBS, N. M.—Fred Turner, Jr. 1-B State, SE SW 4-17-36e, 4 miles west of South Lovington pool, established a potential rating of 25 bbl. per hour based on several tests to rate probably the most important discovery for the southeast New Mexico district this year. This well had saturation from 4,887 ft. to total depth 5,175 ft.

OHIO, KENTUCKY

Wellington Pool Gains Substantial Gas Well

COLUMBUS.—The Ohio Fuel Gas Co. completed another good well on the east side of the middle Wellington pool on the Sutliff Consolidation, Lot 4, Wellington Township. Sand at 2,361-66 ft. gaged 713,000 cu. ft. of gas and the second sand at 2,382-95 ft. had an additional 1,397,000 cu. ft.

A Berea sand well was completed for 1,840,000 cu. ft. 2 miles south of the McDonald oil pool, Section 16, Center Township, Monroe County, by Guy McKelvey on F. W. Kindelberger. Sand was found at 2,117-23 ft.

Pure Oil completed a 798,000 cu. ft. well on W. A. Taylor, Lot 21, Licking Township, Muskingum County, 1 mile southeast of the Nashport oil pool. Clinton sand was found at 3,318-73 ft.

Two producers were completed by Leonard Hines on the Stoffle tract, Section 1, Franklin Township, Monroe County. No. 9 made 40 bbl. at 1,290-1,308 ft. and No. 10, 30 bbl. at 1,315-41 ft.

WESTERN KENTUCKY

OWENSBORO, Ky.—Several very good initial producers were completed in Union County in the week in review, the largest having been Ashland Oil & Refining Co. and Basin Drilling Co. 1 Buckman, in 21-P-19, Uniontown pool, estimated at 675 bbl. per day from Cypress sand at 2,279-90 ft., total depth. It had not been shot. The Uniontown pool has three pays, Waltersburg, Tar Springs and Cypress sands.

No wildcat completions were reported.

EASTERN KENTUCKY

ASHLAND.—Discovery of oil in a "grass roots" pay at 85 ft., identified as near the base of the Maysville in the Ordovician, 4 miles east of Owingsville, in Bath County, has aroused considerable interest. The discovery was accidental, during drilling of a water well. When put on the pump, the well produced 24 bbl. per day. Ashland Oil & Refining Co. then drilled a well 1,600 ft. from the discovery and also go a 24-bbl. producer.

Reports from other Eastern Kentucky counties show that two gas wells and one dry hole were completed, one gasser being an unusually good well. Inland Gas Co. 256 J. H. Hammonds et al, on Bull Creek of Licking River, in Magoffin County, was rated at 2,040,000 cu. ft. open flow from the Maxon pay, total depth 1,245 ft. Kentucky West Virginia Gas Co. 5,532 Albert G. Wells farm, on Brushy Fork of Daniels Creek, Johnson County, was rated at 267,000 cu. ft., open flow, after shot from total depth of 2,375 ft. in shale. The dry hole was Inland Gas 257 Virginia-Kentucky Coal Co. tract on Ball's Fork of Troublesome Creek, Knott County, total depth 1,557 ft. in broken sands.

INDIANA

EVANSVILLE, Ind.—Three oil wells and two dry holes were reported from Indiana. One of the new wells was a wildcat that found oil in a hitherto unproductive spot. This was Baldwin Barrett and Meisner 1 Steckler, NE NE NW 35-1n-12w, Knox County, which started at 25 bbl. a day, after a shot in Biehl sand at 1,408-20 ft.

INDIANA WILDCAT COMPLETIONS

Gibson County: Cherry & Kidd and O'Neal 1 Mabel Redman, SE NE NE 27-3s-12w, dry at 2,729 ft. Glen Dean 2,069 ft., Barlow 2,273 ft., Renault 2,495 ft., Ste. Genevieve 2,595 ft. It recovered only salt water on a 1-hour drill-stem test.

Knox County: Baldwin Barrett and Meisner 1 Steckler, NE NE NW 35-1n-12w, Biehl sand at 1,408-20 ft., TD 1,422 ft. Pumped 25 bbl. after 15-qt. shot.

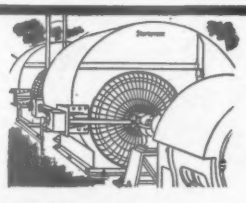
EASTERN TEXAS

Smith County Wildcat To Be Tested

DALLAS.—Phillips Petroleum Co. 1 McMinn, M. Long Survey, 2½ miles northeast of Greshame, which has been shut down for several month curing titles, was about to be tested for production. A high-pressure separator and lease storage and tubing had been moved to the lease. Interest ran high when this well showed oil on pits while drilling at 8,056 ft., and a spirited

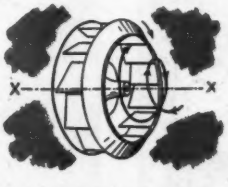
of Fan Controls

This is Sturtevant Vane Control



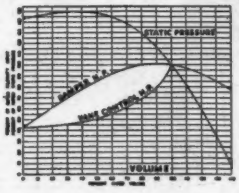
...All "Plus" Advantages!

Sturtevant Vane Control offers the major advantage of utilising a constant speed a.c. motor with simple control and in addition permits regulation of the fan output to the exact volume of flow at the exact pressure needed. There is no wastage of power input as in a variable speed a.c. motor. There is no wastage of pressure as encountered in damper control. There is more even distribution of gases and ash to the fan wheel blades —prolonging life.



...Instant Response!

The adjustable vanes at the fan inlet give the entering air or gas a greater or lesser spin in the direction of rotation of the fan rotor. The "twist" imparted to the air entering the rotor is de- or accelerated, correspondingly affecting the pressure-volume of the fan output without need for change in the speed of the fan or the motor. Adjustment of air flow to meet fluctuating requirements of the combustion system is *instantaneous!*



...Saves Power!

The above chart plainly shows the power savings over damper control. As the vanes close, the volume and pressure of air handled in the system is reduced—and the lessening fan output directly affects the input of the motor. Power savings are proportionate to the periods during which the system does not operate at full capacity. This control is in demand for all types of power plant and industrial applications where fans are subjected to variable loads.

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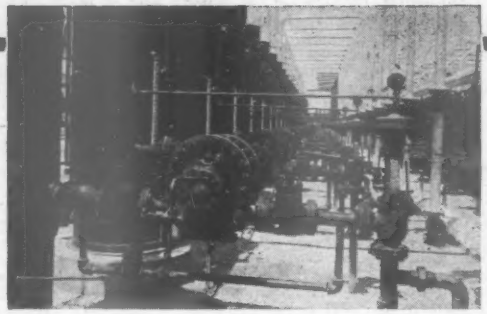

A leading oil company installed 81 Bowser Bassler Meters at as many individual wells, replacing an equivalent number of tank settings. The cost of the meters was, on an average, less than one-fifth of the cost of the tanks they replaced.

Here's what an official of the company reported:

"It is estimated that the installation of these meters has resulted in a net over-all saving in capital investment of $128,000. Operating costs have been materially reduced by reason of the fact that one gager can read a large number of meters compared to the gaging of individual flow tanks. Savings from this source would probably total $1,200 per month in labor.

"The system has the additional advantage of making it easy to separate wet and dry oil at a single central tank setting or each lease, thereby reducing treating costs, losses from drainage, etc. Savings from this source are difficult to estimate but amount to a very considerable figure."

From the standpoints of economy *and production*, every well in America, except possibly some small single wells, should have Bowser Meter installations. We'll gladly send you details, and an engineer will follow up, if you wish. Please write us. BOWSER, INC., Fort Wayne 5, Indiana.

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Strom BALLS Serve Industry

WILDCAT COMPLETIONS AND DISCOVERIES

	Week ended June 24, 1944					Cumulative total, 1944				
	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
Ohio	0	0	0	0	0	0	0	9	30	39
Indiana	1	0	0	1	2	3	0	0	10	13
Illinois	1	0	0	9	10	11	0	0	135	146
Kentucky	0	0	0	0	0	4	0	0	27	31
Michigan	0	0	0	1	1	4	0	1	114	119
Kansas	2	0	0	7	9	30	0	5	202	237
Nebraska-Missouri-Iowa	0	0	0	0	0	1	0	0	7	8
Oklahoma	0	0	0	3	3	23	0	12	118	153
Texas:										
North Central	0	0	0	5	5	29	0	0	132	161
West	0	0	0	5	5	15	0	3	82	100
Panhandle	0	0	0	0	0	0	0	0	4	4
Eastern	0	0	0	1	1	3	0	1	67	71
Gulf Coast	1	2	2	6	11	21	7	8	92	128
Southwest	0	0	0	3	3	15	4	10	124	153
Total Texas	1	2	2	20	25	83	11	22	501	617
Louisiana:										
Northern	0	0	0	2	2	2	0	0	28	30
Southern	0	0	0	0	0	3	5	0	30	38
Total Louisiana	0	0	0	2	2	5	5	0	58	68
Arkansas	0	0	0	0	0	2	0	0	26	28
Mississippi	0	0	0	0	0	2	0	0	31	33
Alabama-Georgia-Florida	0	0	0	0	0	2	0	0	7	9
Montana	1	0	0	0	1	2	0	1	10	13
Wyoming	1	0	0	0	1	8	0	1	8	17
Colorado-Utah	0	0	0	1	1	2	0	0	21	23
New Mexico	0	0	0	3	3	2	0	1	35	38
California	0	0	0	8	8	3	0	5	83	91
Total United States	7	2	2	55	66	187	16	57	1,423	1,683
Total previous week	7	0	2	81	90					

lease and royalty play took place. The well was drilled to total depth of 10,001 ft., with 5½-in. casing cemented at that depth. Glen Rose was topped at 7,760 ft.

Cherokee County.—A small amount of oil was recovered on drill-stem test from 10,819-65 ft. at Humble Oil & Refining Co. 1-B Stephens, Jordan Survey, northwest outpost to the Larissa pool.

Franklin County.—Tide Water Associated Oil Co. and Seaboard Oil Co. 1 Mund, south side of the New Hope field, total depth 8,190 ft., flowed 3½ bbl. oil per hour while testing through perforations opposite Pittsburg pay, Travis Peak formation, at 7,950-54 ft.

Camp County.—A good well is in prospect for the southwest side of the Pittsburg pool. Ryan Consolidated Oil 1 First State Bank, total depth 8,073 ft., perforated casing opposite Travis Peak and indications were that it would be one of the best wells for this part of the pool.

Wood County. — Northeast limit of the pool was defined at Amerada Petroleum Co. 1 Grice, H. Anderson Survey, which failed to produce from the Paluxy and was dry at 6,344 ft. Only two active tests are now left in the field, and it is doubtful that many more locations will be made.

Panola County. — Union Producing Co. 1 Chadwick, 3 miles north of Carthage, had little porosity in upper Pettit, and was coring for lower pay in this zone. The great Carthage gas and distillate field continues active, with two new outpost locations staked during the week. Columbian Carbon Co. 1 Baldwin was staked in George Glass Survey, near Shelby County line, and 6 miles west by north of Juoaquin. Southern Producing Co. 1 Soape is located on 138-acre tract in J. N. Williams Survey, 2½ miles southwest of Feazel & Kinsey 1 E. N. Ross gasser.

Van Zandt County.—The important test of Humble Oil & Refining Co. 1 Surratt, 1½ miles southeast of Edgewood in F. W. Wrede Survey, was drilling below 7,975 ft. in sandy shale.

Sabine County.—Coline Oil Co. 1 Temple Lumber Co., Larkin Groce Survey, which was temporarily abandoned at 5,566 ft., will be deepened to 9,000 ft.

MISSISSIPPI

Heidelberg Extension Well Flows 200 Bbl. Per Day

JACKSON.—Gulf Refining Co. 1 Morgan, SW SW 35-1n-12e, 2½ miles west and 1 mile south of the Heidelberg discovery well, confirmed favorable drill-stem tests, by flowing 200 bbl. per day through tubing, after perforating casing at various intervals from 4,848-5,092 ft. Top of the chalk was recorded at +3,393 ft., and top of the Eutaw at +4,427 ft.

There are now 14 active operations in the Heidelberg pool, with most of the activity in Sections 19, 20, 29, 30, 31 and 32-1n-13e, but the result of the Morgan test will probably bring more activity to the west. There were only two official completions during the week, Gulf Refining 1 Armstrong, SW SE 19-1n-13e, was rated at 348 bbl., from pay zone at 4,975-5,010 ft., in the Heidelberg pool, while Carter Oil Co. 2 Garrett, SW NE NW 11-11n-3e, in the Pickens pool, was completed for 310 bbl. from pay at 4,840-56 ft.

Seven active operations are reported from Florida, one each in Collier, Highlands and Madison counties and four in Dade County. Humble Oil & Refining Co. 2 Gulf Coast Realty Co., SW SE 30-48s-30e, Collier County, nearest well to its Florida discovery, was reported drilling below 12,000 ft. W. G. Blanchard et al spudded its 1 Grossman, SW SW 25-55s-37e, and same interests' 1 Everglades, SW SW 31-53s-35e, is drilling at 10,000 ft. Both tests are in Dade County. Humble 1 State, NE NW 30-55s-36e, same county, is drilling below 500 ft., and location is reported for Consumers Oil & Fuel Co. 1 State, C NW 24-54s-35e, also in Dade County. Humble is reported starting operations at its 1 Carlton estate, SW NE 34-38s-29e, in Highlands County. H. L. Hunt 2 Gibson, SE SW 6-1s-10e, Madison County, is reported dry below 5,000 ft., and may be abandoned.

Georgia reports four wildcat operations, two in Clinch County and one each in Early and Mitchell counties, while Alabama reports wildcats drilling in Escambia, Lamar and Washington counties.

Pound Succeeds Howard on Compact Research Group

Walker T. Pound, conservation officer of Oklahoma Corporation Commission, was appointed Oklahoma member of the Research and Coordinating Committee of Interstate Oil Compact Commission by Gov. Andrew F. Schoeppel, of Kansas, chairman. He succeeds Dan O. Howard, who joined the Marines.

WALKER T. POUND

At Oklahoma A. and M. College and University of Oklahoma, Pound majored in economics and business law, with some geology courses. In 1928 he joined the production division of Shell Oil Co., Inc., at Wink, Tex., as a roustabout. Before leaving Shell in 1931, he worked in various positions in production, scouting, materials, and auditing in Texas and New Mexico.

Pound was appointed receiver for Kilbourne Oil Co. in 1934 and the next year he joined the oil and gas conservation department of Oklahoma Corporation Commission.

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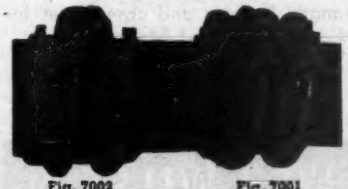

Fig. 7002 Fig. 7001

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SEE COMPOSITE CATALOG—PAGES 3101 to 3120

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Among the

Drilling Contractors

C. H. Withers, of Regina, Sask., who drilled Vera Oilfields 3 in LSD 11, 12-42-24w3, in the Unity Valley area of west-central Saskatchewan, has a contract from the same company for another well 2 miles south, for which equipment is now being moved.

Baker Drilling Co., Los Angeles, has been awarded contract to drill a wildcat for Shield Petroleum Co. on the Bernard property southwest of Inglewood in Section 18-2s-10w and an early spud will be made.

Camay Drilling Co. has started a second outpost for Capital Co. in the North Whittier Heights district of Los Angeles basin and is concluding drilling operations on the first well started.

Can-Tex Drilling Co., of Calgary, Alta, has contract for California-Standard No. 8 to be drilled in the Steveville-Princess field in Alberta with location in NE¼ LSD 16, 21-20-12w4. The contract marks the resumption of operations in this area by Standard Oil Co. of California, which, through its subsidiary, Standard Oil Co. of British Columbia, pioneered the field some years ago.

McFann Drilling Co. has started a wildcat for Shell Oil Co., Inc., on the Wolfsen lease near Los Banos in Merced County, California, and recently resumed drilling after landing surface pipe at 520 ft.

Olson Drilling Co. has been awarded contract to drill the Atlantic Refining Co. 1 Brown, which has been staked in NWC SW 19-8s-8e, Bryan County, Oklahoma. It is to be a deep test to the Bromide and McLish zones.

Bryan Petroleum Co. will be the contractor on the 1 Zwiegel, in NE SW NW 16-3s-10e, Atoka County,

Crew of McAlester Fuel Co., at its 1 Nipper, drilled by the company in the Dorcheat-Macedonia pool, Arkansas: G. B. Yates, E. W. Carroll, C. W. Moore, W. F. Thompson, and L. R. Trippett, driller

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Oklahoma, which will be drilled by J. Gordon Wakefield and C. A. Palmer.

R. N. Dodd has been awarded drilling contract on the Carl Grimes 2 John Pelon, in NW NE NE 3-4n-15w, Allegan County, Michigan.

Joe Patterson, rotary contractor of Seminole, Okla., will drill the 1 State for Atlantic Refining Co. and associates, in SE SWC 36-7s-8e, west of Allison, in Bryan County, Oklahoma.

Max Spidel is the drilling contractor on the Raymond Donnersberger 1 Pawlak, Niemezyk, Marklevitz et al, in SE NE SW 4-3n-12w, Allegan County, Michigan.

Ashby Drilling Co. is the drilling contractor on the Gulf Refining Co. 1 B. W. Walther, in NE SW NE 7-14n-6e, Bay County, Michigan.

Union Rotary Corp. has been awarded contract on the Cities Service Oil Co. 1 Samuel T. Dowd, in SE NW NW 33-16n-3w, Isabella County, Michigan.

Muskegon Development Co. is the contractor on the Chapman Oil Co. 1 Herbert Telzlaff, in C S½ NW SW 4-15n-9w, Mecosta County, Michigan.

Lupher Drilling Co. has the contract on the Pure Oil Co. 1 Jacob Boven, in C S½ SE NE 18-22n-6w, Missaukee County, Michigan.

Andrew S. Hoyt has the contract on the Ralph McLellan 1 Wendell and Ida Miller, in SW SW NW 10-30n-3e, Montmorency County, Michigan.

Robert W. Atha is the contractor on the C. W. Teater and Americrude Oil Co. 1 Wexford County Road Commission, in NE SE NW 10-21n-9w, Wexford County, Michigan.

Olson Drilling Co. has staked 1 Heenan, in C NE NE 32-3n-7w, just north of Marlow, Grady County, Oklahoma. It will be a deep test.

Stuart A. Merrill will drill two tests in Michigan for J. V. Wicklund Development Co. These are the 1 Leonard and Eda Shudark, in NE NW NE 31-14n-3e, Bay County, and the 1 Charles H. Sumner, in NW SE SW 25-20n-1e, Gladwin County.

Big Chief Drilling Co. has purchased a new heavy-duty unit in California, and upon delivery the unit will be moved to the West Moore, Oklahoma, field. The company also is returning a rig from the Illinois basin.

Rogers Brothers Drilling Co. has resumed drilling on its 1 Belding, in Crosby County, Texas, and was drilling ahead at 1,900 ft.

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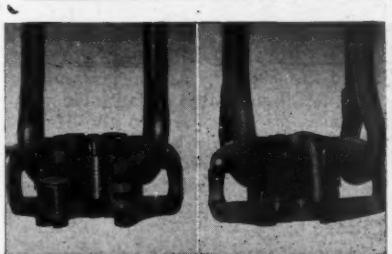

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PERSONALS

Technical Phases Of Refining Are His Chief Worry

AS technical assistant and a member of the refinery control board it is Charles M. Ridgway's job with Pure Oil Co. to oversee technical phases of refinery activity. His service with Pure began in 1932, when he joined the company as superintendent of its Midland, Mich., plant. He was shifted soon afterward to the Heath refinery and hardly had settled there when he was moved to Muskogee, Okla. In the fall of 1935 he was transferred to the technical staff in Chicago.

Ridgway was born 43 years ago in the village of Hydetown, Pa., 3 miles northwest of Titusville, birthplace of the oil industry. Graduating from University of Michigan in 1923 with a B.S. in chemical engineering, he worked a while for a steel company in Titusville and then went to Boston, where he was employed first by E. B. Badger & Sons, manufacturers of distillation equipment, and then by Smith & Leslie, in a similar line of business. This training helped to prepare him for the position which was to mark the beginning of his oil-refinery career, that of superintendent of the Old Dutch Refining Co.'s plant in Muskegon, Mich. It was from that post that he moved to Pure.

By way of recreation—when there is time for it—Ridgway likes fishing, golf, or a game of contract whist.

P. F. Shannon has been appointed production manager for Imperial Oil, Ltd., at Calgary, Alta., succeeding the late J. H. McLeod. Shannon has also been elected president of Royalite Oil Co., Imperial subsidiary in the Turner Valley field, and succeeds McLeod also on the executive staffs of the Foothills, Dalhouse, Lowery and Valley Pipe Line companies. Shannon has served Imperial's Colombian affiliate, Tropical Oil Co., since 1924, first as field superintendent at Barranca Bermeja, and later as manager of all producing operations in that South American country.

E. Van S. Lowerre, scout for Pure Oil Co. in the Texas Panhandle, with headquarters in Amarillo, for the past year, has returned to the company's Oklahoma City office. Lowerre, dubbed "dean of scouts," is succeeded at Amarillo by **Charles Davis,** formerly in the Tulsa office. Davis' place in Tulsa is filled by **Jack Lander,** transferred from Shawnee, Okla.

MEGLAUGHLIN

Barry F. Meglaughlin, formerly manager of the publications of the Esso Marketers, has been promoted to assistant on public relations to **A. Clarke Bedford,** general sales manager of the Esso Marketers. Meglaughlin joined Standard Oil Co. of New Jersey, in 1934.

John R. Suman, vice president of Humble Oil & Refining Co., Houston, and first vice president of Harris County War Chest, has been chosen to represent the chest's board of directors on the board of United War Chest of Texas.

Sherman T. George, senior tester in the laboratory of Shamrock Oil & Gas Corp.'s refinery at Sunray, Tex., has been promoted to safety director.

R. D. Gibbs, manager of field operations of Union Oil Co. of California, has been appointed assistant to **W. L. Stewart, Jr.,** executive vice president in the Los Angeles headquarters.

Tom Potter, formerly with an oilfield service organization in Midland, Tex., has joined Cities Service Oil Co.'s West Texas-New Mexico organization as geological scout. Potter, whose office continues to be in Midland, takes the place recently vacated by **Joe G. Sauer,** who was promoted to Permian Basin landman. Sauer succeeded **John W. Glahn,** who resigned to become an independent operator.

R. N. MORRISON

R. N. Morrison, New York, general purchasing agent for The Texas Co., has been elected chairman of the oil-company buyers' group of the National Association of Purchasing Agents. He succeeds **O. E. McClatchie,** Tulsa, of Barnsdall Oil Co., chairman for the past 10 years, who declined reelection. He was presented with a set of hand-painted beverage glasses. In 1926 Morrison became buyer and assistant purchasing agent for California Petroleum Corp. and when the company became The Texas Co. (California) he continued in that position until 1939, when he was transferred to Texaco's New York headquarters as purchasing agent. He was named general purchasing agent last November.

W. W. Lofland, formerly district chief clerk for Lone Star Gas Co. at Abilene, Tex., has been made subdistrict manager at Baird, Tex.

W. R. Phipps, manager of Gas Service Co. at Wichita, Kans., heads the Fifth War Loan drive in Sedgwick County, whose quota is $26,570,000.

J. W. Vaiden, Tulsa, president Natural Gasoline Association of America, and **Ferd Spang,** Butler, Pa., president Petroleum Equipment Supplies Association, have been appointed to membership in Petroleum Industries War Council by Ralph K. Davies, deputy petroleum administrator.

O. F. Moore, assistant secretary of Ohio Oil Co., Findlay, Ohio, has been made assistant manager of the company's pipe-line department also.

Dr. L. C. Snider, professor of geology at University of Texas, is at the Mayo Hospital, Rochester, Minn., undergoing preparation for a major operation. His address is Room 846,

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Kahler Hotel, Rochester. For many years Dr. Snider was consulting geologist for the Henry L. Doherty interests in New York and he was chief geologist for Empire Gas & Fuel Co., Bartlesville, Okla.

Gilbert E. Brower, chief materials engineer for American Airlines, Inc., has been named vice chairman of the coordinating lubricants research committee, sponsored by American Petroleum Institute and Society of Automotive Engineers. His work will be to centralize, correlate and promote research on problems common to the petroleum and automotive industries.

Fred E. Hummel, Shell Oil Co., Inc., has been transferred from field engineer at Ventura, Calif., in the coastal district, to field engineer at Long Beach, in the Los Angeles Basin division.

MARKET QUOTATIONS

Prices as of June 27, 1944

(This service is abbreviated because most refinery products are selling at the Government's price ceilings. Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gallon.)

REFINERY GASOLINE

Octane (A.S.T.M.):	80†	72-74
Mid-Continent	6.00-6.25	5.750-6.000
Gulf Coast	6.00-6.50	‡5.750-6.250
Northeast Coast	9.80	9.200
California	.....	6.255-6.500

*Basis Oklahoma Group 3. †1939 C.F.R. (research method.) ‡Unleaded.

NATURAL GASOLINE

Grades:	26-70	18-55
Oklahoma (Group 3)	4.750	5.700
North Texas	4.375	5.250
North Louisiana	4.375	5.250
California	4.875	5.500

CRUDE-OIL PRICES

Representative posted schedules per barrel.	
East Texas	$1.25
Conroe	1.43
Tepetate, Louisiana	1.18
Illinois basin	1.37
Pecos County, Texas	.95
Bradford, Pennsylvania	3.00
Van, Van Zandt County, Texas*	1.08

*No change since 5-21-41.

A.P.I. REFINERY REPORT

Week ended June 17, 1944

(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks—Gasoline	Stocks—Residual	Stocks—Gas oil
Appalachian	151	3,103	474	1,155
Ind., Ill., Ky.	779	18,604	3,201	5,431
Okla., Kans., Mo.	372	7,782	1,367	1,344
Censored area*	2,510	37,556	15,840	18,015
Rockies	119	2,537	639	343
California	821	15,686	30,496	7,849
Total 6-17-44	4,752	85,286	52,017	34,137
Total 6-10-44	4,670	86,911	51,221	33,669
Total 6-19-43	3,899	79,591	66,931	31,751

*Reports combined on East Coast, Texas Gulf Coast, Louisiana-Arkansas and Inland Texas at request of PAW.

CRUDE-OIL STOCKS

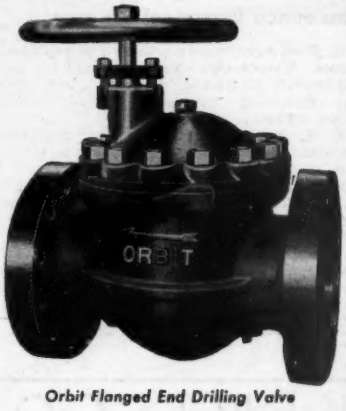
(Bureau of Mines Estimate)

Week ended:	Bbl. of crude*
June 17, 1944	230,585,000
June 10, 1944	231,290,000
June 19, 1943	243,516,000

*Excludes unrefinable California stocks.

ORBIT
DRILLING VALVES ARE QUICK OPENING

ONLY 2½ to 5 TURNS ARE REQUIRED TO FULLY OPEN OR CLOSE THE ORBIT DRILLING VALVE. THE SEATS ARE PROTECTED AGAINST DAMAGE FROM DRILLING TOOLS AND WIRE LINES.



Orbit Flanged End Drilling Valve

ORBIT DRILLING VALVES ARE AVAILABLE IN BOTH FULL OPENING AND NOMINAL OPENING SIZES. WITH FLANGED OR SCREWED ENDS.

See pages 2194 to 2211 in 1944 Composite Catalog

ORBIT VALVES

OIL WELL IMPROVEMENTS CO.
Since 1912
Tulsa, Oklahoma

Equipment Progress

Ohls Joins WECO as Chief Engineer

R. L. Ohls has been appointed chief engineer of Well Equipment Manufacturing Corp., Houston.

After receiving his engineering degree from the University of Texas, Ohls spent 2 years in Schenectady with General Electric Co. as mechanical and test engineer. For the past 7½ years he has served as designing engineer for Reed Roller Bit Co., Houston.

Valve and Meter Companies Announce Personnel Changes

H. Boezinger, vice president, Merco Nordstrom Valve Co., and district manager Pittsburgh Equitable Meter Co., announces the following changes in their Pacific Coast offices:

E. H. (Ernie) Adams has been appointed assistant district manager and will operate out of the Pacific Coast district office in Los Angeles. R. L. Ford, formerly located in the Seattle office, has been transferred to the Los Angeles district office where he will handle the sale of water meters in Southern California. Gilbert Bowman has been placed in charge of the San Francisco office. Frank Tangney, formerly with National Meter Co., which was acquired in 1914 by Pittsburgh Equitable Meter Co., has been placed in charge of Pittsburgh's Seattle office. Sales headquarters for the Pacific Coast of both Merco Nordstrom and Pittsburgh are located at Los Angeles.

New Portable Tensile and Guided Bend Weld Testing Machine

A portable weld testing machine introduced by Air Reduction Sales Co. performs all these three weld tests: (1) Reduced section transverse tension test; (2) guided bend test (a complete 180° face or root bend); (3) longitudinal all-weld metal tension test (0.505 in.).

Two outstanding advantages of this machine are stressed by the manufacturer: First, its ability to provide accurate data on tensile strength and ductility of weld specimens, as determined by the three tests; and second, its relatively light weight which enables users to perform weld tests right on the job. This latter feature makes the machine particularly useful for firms doing extensive field work such as pipe-line installations, construction and similar jobs performed in remote locations.

The machine operates on the principle of the hydraulic jack. A hand-operated pump transmits pressure through a hose to the plunger. While the maximum load is 40,000 lb., the use of reduced section specimens permits tests on metals of 150,000 lb. per sq. in. or higher tensile strength. The machine is described and illustrated in booklet AD1-889.

Prichard New Kobe West Texas Manager

John Prichard has just been appointed district manager in charge of West Texas operations by Kobe, Inc., Huntington Park, Calif.

Prichard, who will make his headquarters at Odessa, joined the Kobe organization in 1940. He was advanced to district representative in Oklahoma City in 1941 and a year later was transferred to Illinois as Kobe's district manager for that area. In 1943 he held the same position in the company's Kansas-Nebraska territory where he remained in charge of operations until his recent appointment.

Timken Introduces New Worm-Drive Tandem Axle Unit

The SW-3002 series new worm-drive tandem axle unit, announced by the Timken-Detroit Axle Co., Detroit, is engineered for heavy-duty highway transport with modern high-power engines.

Increased worm centers permit the use of a larger-diameter worm, stronger worm shaft and larger worm wheel, with consequent reduction in pressure per square inch on the worm teeth.

Controlled lubrication is assured by a close-fitting oil trough or carrier around the rear portion of the worm wheel and an oil housing over the worm. This feature provides positive lubrication even when pulling heavy loads on long grades at low axle speeds.

More rigid carrier legs prevent deflection under heavy loads and high torque, and a 14-dowel stud attachment secures the carrier to the axle housing..

Timken's patented full-floating spring suspension equalizes the load between the two rear axles of the tandem unit. Spring seats are mounted on Timken tapered roller bearings on a strong tubular cross member. Spring ends float on hardened steel spring pads on the axle housing, eliminating shackles. Springs act as balance levers when the truck passes over road obstructions, cutting vertical frame lift in half and reducing impact shocks on vehicles, cargo and road surface.

New Patterson-Ballagh Nonspin Safety Mud Gun

A high-pressure type, heavy-duty mud gun, made of cast steel, is equipped with extra-large packing glands and Alemite fittings. It locks both vertically and horizontally. As the center line of the discharge passes through the inlet there is no tendency to spin.

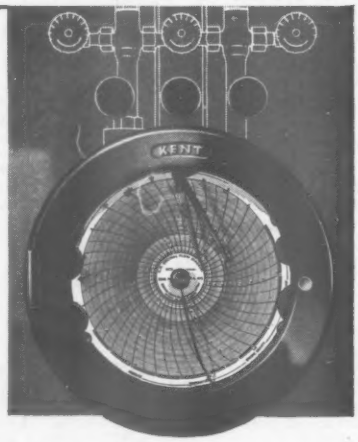
An important feature is the rubber-lined nozzle, made of synthetic rubber, especially compounded to resist oil. Actual field use indicates this nozzle to develop minimum back pressure and to hold to gage longer than the metal formerly used.

KENT CONTROLLERS

air-operated, hydraulic or electrical, as may be required.

These controllers are extensively employed for the control of flow, pressure, temperature, pH, liquid level, flow ratio, specific gravity and for the automatic control of boilers.

They embody the Kent standard of workmanship and design.



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GEORGE KENT

Trade Literature

Jessop Steel Co., Washington, Pa.—Booklet on hollow and solid drill steels, in rounds, hexagons and quarter octagons.

Rochester Ropes, Culpeper, Va.—Volume 2, Number 5, of The Rope Maker, the company's pocket-size house organ.